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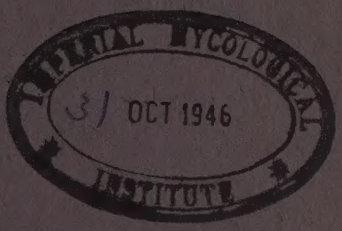

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The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

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DISEASES CAUSED BY BACTERIA AND FUNGI

ROSENBUSCH, F., & GELORMINI, N. (1945.) Ulceraciones crónicas del conejo rex. [**Chronic ulcerations in Rex rabbits.**]—*Gac. vet., B. Aires.* **7.** 134–139. **1689**

The authors discuss the origin and significance of chronic ulcerations found in a Castorex rabbit breeding unit. Ordinary therapeutic measures and neo-salvarsan treatment proved unsuccessful. At P.M. examination abscesses were found in the liver, spleen and other organs with ulcerations in the tarsal region, sometimes on all four legs.

Examination for the organism of venereal spirochaetosis proved negative, but microscopic examination revealed *Staphylococcus albus* and an autogenous vaccine proved successful in 38 out of a total of 41 infected rabbits. Preventive vaccination was successful in 101 out of 104 rabbits.—H. G. ARAMBURU.

SEELEY, H. W., Jr., ANDERSON, E. O., & PLASTRIDGE, W. N. (1944.) **Mastitis and the plate count of milk. III. A quantitative study of the growth of *Streptococcus uberis* in various plating media. IV. The contribution of *Streptococcus uberis* mastitis to the plate count of herd milk.**—*J. Milk Technol.* **7.** [No. 4.] 191–199. For previous parts, see *V.B.* **12.** 521.] **1690**

III. Standard agar and Edwards' crystal violet æsculin ox blood agar are equally favourable for the growth of *Str. uberis*. Ox blood agar supports the growth of more colonies than does Edwards' medium.

Colonies grown in standard agar average about 37% more surface area than those grown in ox blood medium.

Although ox blood agar yields more colonies of *Str. uberis* than Edwards' agar, the latter permits some degree of preliminary identification of the organisms, which are detected by a browning of the medium around the colonies. Edwards' agar therefore has some value in the detection of *Str. uberis* infection.

IV. 23 quarters secreted milk containing on an average 3,000 organisms of *Str. uberis* per ml. with a range of 30 to 44,000. The numbers found were not sufficient to influence the plate count of high-count milk. In some cases, however, as in a small herd in which the incidence of *Str. uberis* is high, organisms released from the infected animals might materially increase the total plate count.—I. W. BROCKLEHURST.

BRYAN, C. S., CUNKELMAN, J. W., & YOUNG, F. W. (1945.) **Recent advances in mastitis control.**—*Quart. Bull. Mich. agric. Exp. Sta.* **27.** 382–385. **1691**

This general article in popular terms lays special emphasis on the importance of hygienic methods of control coupled with early diagnosis, the elimination of infected cows with badly damaged udders and the early treatment of others.—D. D. OGILVIE.

*SCHULT, J. H. (1941.) Milzbrandkarte für Grossdeutschland. [**Anthrax map for Greater Germany.**] —*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 413.] **1692**

Tanneries are the main source of outbreaks of anthrax. Foodstuffs of foreign origin and places in which carcasses are buried and which are then recultivated are responsible for sporadic outbreaks.

The main areas in which, according to statistics, there have been most outbreaks of anthrax, include the districts of Schleswig, Stade, the north of the district of Hanover and part of the province of Oldenburg in western Germany, the districts of Magdeburg, Merseburg and Erfurt (eastern part) and the provinces of Anhalt and Thuringia (northern part) in central Germany, and the lower Danube in the south-east.

The highest incidence was in the counties of Steinburg and Rendsburg in the district of Schleswig with an average of 36 and 34 cases per year respectively. There was an increase of anthrax in Austria. It is stated that the disease also increased in Moravia (Czechoslovakia), this article being written after the German invasion of that country.—J. ZWEIG.

*DEKARIS, V. (1943.) [**Value of Ascoli's thermo-precipitation test in anthrax diagnosis.**]—*Vet. Arhiv.* **13.** 27. [Abst. from abst. in *Dtsch. tierärztl. Wschr.*/ *Tierärztl. Rdsch.* **51/49.** 156.] **1693**

D. concludes that the Ascoli precipitin reaction is not specific enough to differentiate between extracts made from *Bacillus anthracis* and *B. anthracoides*, being positive in both cases in dilutions ranging from 1 : 10 to 1 : 100. Accidental infection or contamination P.M. with *B. anthracoides* may lead to errors in diagnosis. —J. ZWEIG.

SFORZA, M. (1944.) Tubercolosi bovina in Eritrea. (Studio microbiologico di ceppi autoctoni). [**Bovine TB. in Eritrea.**]—*Boll. Soc. ital. Med. Ig. trop. (Sez. Eritrea), Asmara.* **3.** No. 1. 497-587. Reprint pp. 91. [English summary.] **1694**

The prevalence and distribution of TB. in cattle in Eritrea is discussed. Although the disease was detected in animals slaughtered at Asmara and one or two cases were encountered in Abyssinian animals, it is considered that local infection is very rare, and in confirmation of this it is pointed out that no tuberculous carcases were encountered at the Asmara slaughter house during the years 1940–42, when owing to war conditions the movement of cattle from neighbouring territories was at a minimum.

Eight strains of the tubercle bacillus have been isolated from cattle in Eritrea; from cultural, morphological and biological studies it is considered that they are identical with the bovine type. As the result of

experimental inoculation of local and European cattle it is concluded that the Eritrean animals have a greater resistance to infection than animals imported from Europe and that the "Arado" breed of the highlands is more resistant than the "Barca" breed of the western lowlands. This was particularly noted in the case of animals inoculated subcutaneously; animals of the "Arado" breed commonly responded by nodule formation at the site of inoculation only.

S. discusses the general position of bovine TB. in Africa, and concludes that its prevalence is correlated with the intensity of European colonization, and in particular with the attempted improvement of stock by importation and cross-breeding and with the stalling and feeding of stock for intensive milk production.

It is suggested that control of the disease in Eritrea should be confined to the control and inspection of animal importations, inspections of dairy cattle and supervision of slaughter houses; further measures may be required if an increase in animal importations occurs and if intensive dairying methods become more general.

—U. F. RICHARDSON.

SFORZA, M. (1943.) Sul comportamento di ceppi autoctoni di tubercolosi bovina nell'infezione sperimentale dei polli eritrei. **[Behaviour of locally isolated strains of bovine type tubercle bacilli in experimental infection in fowls in Eritrea.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara.* **2.** No. 3. Reprint pp. 8. **1695**

Ten fowls were inoculated intravenously or intramuscularly with cultures of one Italian and six Eritrean strains of bovine type tubercle bacilli Five of the birds died in 4–12 days, death being ascribed to the mechano-toxic action of the injected organisms and not to their pathogenicity. Five birds survived and maintained condition; they were later slaughtered. Autopsy failed to reveal tuberculous lesions except for a necrotic liver lesion in one bird and a necrotic nodular lesion at the site of inoculation in another. Tubercle bacilli were not demonstrated in any of the birds, except for the fowl with the necrotic subcutaneous nodule, in which acid-fast organisms were detectable microscopically. Subinoculation of a g. pig resulted in typical tuberculosis. It is claimed that in this case the bovine bacillus survived in a fowl 219 days.—U. F. RICHARDSON.

SFORZA, M. (1943.) Comportamento di un ceppo di tubercolosi aviare europea in animali indigeni. **[Avian TB. in native fowls and cattle in Eritrea.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara.* **2.** No. 2. Reprint pp. 8. **1696**

A strain of avian tubercle bacillus isolated from a pheasant in Italy proved highly pathogenic to rabbits and fowls in Eritrea, but less so to g. pigs and calves, in neither of which did typical nodular tuberculous lesions develop. One calf inoculated subcutaneously with 40 mg. of culture and destroyed after 156 days had only a local lesion at the site of inoculation. Another inoculated intravenously with 5 mg. of culture died in 40 days; P.M. examination of this animal revealed an apical pneumonia progressing towards resolution. A third calf inoculated intrapleurally with 5 mg. of culture and destroyed after 66 days had a small nodule in the cardiac lobe of the lung. This animal gave a positive reaction to avian tuberculin, but the animal inoculated subcutaneously gave negative reactions to both bovine and avian tuberculin.

S. comments on the paucity of references in the literature to the results of experimental infection of cattle with avian type bacilli. His results confirm those of other workers who have claimed that when injected intravenously avian type bacilli may produce a fatal infection. Given *per os*, especially to young calves, they produce generalized infection of the mesenteric lymph nodes with caseating focal lesions, while when given subcutaneously they produce a local lesion without any tendency to generalization. Avian type bacilli are less pathogenic to cattle than bovine type but are more pathogenic than the human types.—U. F. RICHARDSON.

SHTEFKO, V. G., & RABINOVICH, E. A. (1940.) Sravnitel'naya patologiya tuberkuleza obez'yan i reptilii. **[Comparative pathology of tuberculosis in monkeys and reptiles.]**—*Trud. moskov. Zooparka.* **2.** No. 1. pp. 121. [French summary.] **1697**

In *Varanus*, the monitor lizard, as in all other animals, TB. spreads by escape of bacilli from an initially infected focus to other tissues. *Varanus griseus* appears to be unique in being susceptible to both natural and experimental infections of bones and joints indistinguishable from spina ventosa in man.

Tuberculous spondylitis in *Varanus*, as in man, is a metastatic disease, the usual point of infection in the initial stage being the alveolar portions of the lower jaw. Characteristically, there appear to be several secondary points of infection, situated in the vertebral epiphyses and the intervertebral cartilages. Exacerbation of these takes the form of either encapsuling caseation, or sequestral cavernization followed by capsulation. There appear to be three forms of tuberculous spondylitis in these reptiles: (a) an inflamed infiltratory variety, temporary in character, (b) an alterative fibroblastic variety, corresponding to the fungoid form of TB. of bone in man and (c) a necrotic variety, analogous to the cavernization process in man. Full pathological details are given, accompanied by numerous photomicrographs and radiographs.

The morbid anatomy and comparative histopathology of pulmonary TB. in monkeys is described in detail. In most cases the causal organism appears to be of the human or bovine type, but no details are given.

Special reference is made to pulmonary TB. in macaques. This is peculiar in the complete absence of any exudate; of monocytes, and of epithelial, lymphoid or giant cells associated with the inter-alveolar tubercles. The connective tissue appears to be completely inactive. The fairly extensive tubercles develop into centres of necrosis, with no defensive encapsulation or calcification. The characteristic reparative reaction of infected tissues in man is completely lacking. It would appear that the mesoderm in the Cercopithecidae is too highly organized to produce any reaction other than a defensive alterative tubercle formation. In the family Cynocephalidae (as exemplified by the mandrill), the presence of fibroblasts and epithelial cells round the tubercles is the first sign of a primitive reparative reaction.

Although no typical tuberculous changes were observed in the lungs of infected New World monkeys, reticular secondary tubercles (or embryonic centres) were found in the lymphoid tissue. These contained large numbers of lymphocytes and lymphoblasts. It is suggested that in the families Cebidae and Hapalidae, the reticulo-endothelial system, interstitially dispersed, is seen functioning with an obvious biological significance. Since this group possesses a real, though primitive, defensive mechanism, it may be for this reason that it is less susceptible to TB. than are the Old World monkeys.—L. LEVENBOOK.

*GEHLING, E. (1942.) Untersuchungen über eine Tuberkulinschnellreaktion nach Sutherland. **[A rapid tuberculin reaction of the type described by Sutherland.]**—*Klin. Wschr.* **22.** 208–210. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 76.] **1698**

121 children 1–14 years old, of whom 66 were known reactors, were tested according to Sutherland's

method of pricking the skin with a needle through a drop of purified tuberculin. Sutherland's claims that reactions could be read within 10–20 min. have not been substantiated. After 48 hours however the results proved comparable with those obtained by the von Pirquet and Moro methods.—M. L. Levi.

Klebanov, M. A. (1944.) Effektivnost' massovoĭ protivotuberkuleznoĭ vaktsinatsii po Kal'mettu. [**Efficiency of mass antituberculous vaccination by Calmette's method.**]—*Probl. Tuberk., Moscow.* No. 5. pp. 43–49. [Abst. in *Bull. Hyg., Lond.* **20.** 395, copied *verbatim.* Signed: D. J. Bauer.] **1699**

The mortality from tuberculosis was investigated in a group of 56,951 infants vaccinated by Calmette's method in Moscow in 1938; a group of 17,469 unvaccinated infants served as control. There was a significant reduction in mortality in the vaccinated group in the first two years of life:—first year deaths—vaccinated 12·3 per 10,000, unvaccinated 21·8; second year—10·4 and 20·8, respectively. The difference in the two groups appeared in the second six months of life (0–6 months, deaths—vaccinated 4·4, unvaccinated 5·7; 7–12 months, 8·3 and 17·0). This is perhaps due to the fact that vaccinated infants were exposed to infection in the home environment before immunity developed. Of the vaccinated infants 2,800 were known to have been exposed to infection; 15 died in the first year. Contact therefore gives a high mortality in spite of vaccination.

The infant mortality from tuberculosis in Moscow and Leningrad fell by 40 per cent. between 1933 and 1940; during this time the number of vaccinations carried out rose greatly (Moscow 3,000–103,000, Leningrad 5,000–48,500).

Birkhaug, K., & Schjelderup, H. (1945.) **Hematological studies in tuberculosis. Variations in the blood cells of guinea pigs inoculated intracutaneously or percutaneously with BCG vaccine.**—*Acta med. scand.* **121.** 1–18. [In English.] [Abst. in *Bull. Hyg., Lond.* **20.** 608, slightly amended. Signed: W. H. Tytler.] **1700**

In experiments by one of the authors previously reported, parallel groups of guineapigs were inoculated with BCG vaccine by the multiple puncture method of Rosenthal, by the scarification method of Nègre and Bretey, and by intracutaneous injection. The rate of development of allergy and the resistance to virulent reinfection were compared in the three groups, with an unvaccinated control group. During the experiments haematological examinations were made on all groups, the results of which form the basis of the present study, the object being to determine which blood changes can be correlated most closely with the progress of active disease, and so give the most reliable diagnostic or prognostic indications.

The authors accept Medlar's views (1929) that: (a) The neutrophile plays the chief role in tuberculous abscess formation and in extension of tuberculous ulcers. (b) The lymphocyte predominates when the tuberculous lesion is healing. (c) The mononuclear leucocyte is the chief cell of new tubercle formation. (d) The total leucocyte counts by themselves roughly indicate the volume of deranged tissue with which the leucocytes have to cope.

In the present study each examination included total leucocyte count, differential counts of neutro-, eosino- and baso-philes, stab cells and segmented cells, monocytes, and lymphocytes, and calculation of the leucocytic index of Crawford (1935), which is an arbitrary numerical value, based on Medlar's work, combining the neutrophile: lymphocyte ratio, the monocyte percentage, and the total leucocyte count.

Of the four groups of guineapigs, that inoculated by the multiple puncture method showed more rapid development of allergy, and greater retardation of disease after virulent reinfection than did the scarification group, which in turn was superior to the intracutaneous group. The rate of evolution of disease on reinfection was thus in the decreasing order, controls, intracutaneous, scarification, multiple puncture. The changes in the blood picture which most closely corresponded to this order were: (1) increase in monocytes, (2) decrease in lymphocytes, (3) leucocytic index of Crawford. The monocyte percentage was considered to be the most sensitive single indicator of advancing tuberculous disease.

Elizalde, P. I., Monserrat, J. L., & Anchezar, B. (1945.) El fenomeno de Koch en funcion de tiempo, dosis y alergia. [**Koch's phenomenon as affected by time, dose (of inoculation) and the state of allergy.**] —*Rev. Asoc. méd. argent.* **59.** 221–234. [Abst. in *Bull. Hyg., Lond.* **20.** 642, amended. Signed: H. Harold Scott.] **1701**

The author discusses animal reactions to inoculations of tubercle bacilli from various aspects, such as whether they result from a first or subsequent inoculation, and if the latter, the interval between inoculations, and the dosage used. The state of allergy or index of modified reactivity is also discussed. The authors have used g. pigs and divided them into groups for different routes of inoculation, cutaneous, intratracheal, and intravenous, and have used some as controls, some treated with histamine and some with tuberculin. At intervals the animals were killed and examined. The authors find that to produce the phenomenon a certain interval must elapse—the pre-allergic period—between the primary and the second injection and that the results produced depend on the virulence of the organism, the route of injection, the dose injected and the time between the injections. If the two are given in quick succession, *i.e.* with only a short interval, the effects are added and the reaction acute; if at a long interval the reaction is more limited and circumscribed. Animals which have received injections of histamine and tuberculin respond by producing a small ulcer, the severity of which depends mostly on the degree of sensitization to tuberculins Those which have been previously inoculated will withstand, for a longer time at least, doses which, if they had been given in the first instance, would have led to early death. Koch's phenomenon is an indication that some degree of sensitization and immunity has been set up.

Brieger, E. M., & Fell, H. B. (1946.) **Warm-stage observations on the development of pseudo-mycelia in cultures of avian tubercle bacilli grown in dilute embryo extract.**—*J. Hyg., Camb.* **44.** 256–263. [Authors' summary copied *verbatim.*] **1702**

1. Avian tubercle bacilli were grown in hanging-drop cultures in embryo extract prepared as for tissue culture, but diluted to 25–5% of its usual concentration.

2. Microscopic branching colonies of pseudo-mycelia developed in the surface film of the hanging drops during the first few days of incubation, after which growth declined.

3. The development of these colonies was studied on the warm stage and proceeds as follows:

(a) The original rods elongate into filaments.

(b) The filaments multiply by ordinary fission and also by forming fine, pin-like terminal sprouts which grow into independent bacilli.

(c) After division the daughter filaments usually remain in contact at the site of fission; their terminal growth continues at an angle to the former cleavage

plane and the colony thus acquires its characteristic branching structure.

(d) The colony enlarges and ramification becomes increasingly complex until about the fifth day of incubation when growth declines. The bacilli remain filamentous.

4. When transferred to embryo extract of normal concentration the pseudo-mycelial colonies revert to the 'standard' type of development characteristic of the more concentrated medium, i.e. they pass through a phase of filamentous proliferation followed by disintegration of the filaments into short, discrete rods.

5. The development of a pseudo-mycelium is compared with the three common types of growth previously seen in more concentrated embryo extract.

6. The results of this investigation shed light on the controversial question of whether the 'mycelial' form of the tubercle bacillus is a single individual formed by 'true' lateral budding or a composite structure produced by the terminal, angular growth of coherent but independent bacilli. Our observations on the living organisms have shown that under appropriate experimental conditions both these forms may develop.

HEDVALL, E. (1945.) Säurefeste Saprophyten, eine wichtige Fehlerquelle bei der Tuberkulosediagnostik. **[Acid-fast saprophytes, an important source of error in tuberculosis diagnosis.]**—*Acta med. scand.* **121.** 73–94. [In German.] [Abst. in *Bull. Hyg., Lond.* **20.** 642, copied *verbatim.* Signed: W. H. TYTLER.] **1703**

The artificial culture of tubercle bacilli has proved of great value in diagnosis, but involves a possible source of error in that it yields no positive evidence that acid-fast strains obtained are truly pathogenic. According to Hedvall the error is more important than is generally appreciated.

An extensive literature is summarized in tabular form, including strains reported by many authors from non-animal, animal, and human sources. Notes of eight cases reported by HUSTED are given, in which acid-fast saprophytes were found in the urine (5), cerebrospinal fluid (2), and pleural fluid (1). Hedvall has previously reported two cases of bronchiectasis in which acid-fast saprophytes were found, in one by culture, in the other in very large numbers in direct films, guineapigs proving negative in both (Hedvall; *Sv. Tuberkulos föreningens förhandlingar* 13/12, 1933). The present paper reports 10 further strains obtained from 1,654 specimens examined by culture on Loewenstein medium after sulphuric acid treatment. Of these, seven were from cerebrospinal fluid, two from sputum, and one from pleural fluid. The microscopic appearance in most strains resembled that of tubercle bacilli, and in one sputum strain the growth on culture closely resembled that of the human tubercle bacillus, but most were more rapid and moist in growth, and many were pigmented.

The author concludes that only guineapig inoculation should be relied on if conditions permit. If not, it should be employed wherever the clinical picture is against tuberculosis, where the microscopic or cultural appearance of the strain is suspicious, and always in bronchiectasis.

DE FAGONDE, A. P. (1944.) Diagnóstico de la enfermedad de Johne, o enteritis hipertrofiante de los bovinos. **[Diagnosis of Johne's disease in cattle.]**—*Bol. tec. Direcc. gen. Ganad., B. Aires.* No. 10. pp. 661–671. **1704**

The author reviews the value of the following methods of diagnosing Johne's disease: examination of the rectal mucosa and of faeces, inoculation into rabbits and g. pigs, precipitation, complement-fixation and johnin tests and examination P.M.—H. G. A.

BATTELLI, C. (1944.) Osservazioni e ricerche sulle pasteurellosi animali in Eritrea. **[Pasteurellosis in Eritrea.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara.* **3.** Reprint pp. 35. [English summary.] **1705**

Strains of pasteurella were isolated from diseased cattle, goats, pigs, fowls, turkeys and rabbits in Eritrea.

The outbreaks of disease in cattle were of the oedematous, thoracic or gastro-intestinal types. In goats, only a secondary role was ascribed to the organisms. In young pigs, early cases in outbreaks were of an acute septicaemic type, with dyspnoea and death in a few hours, whilst later cases were characterized by vomiting, a dry cough and death in 3–4 days. In adult pigs, the infection is said to be enzootic, with an acute form characterized by oedematous swellings usually in the neck region and a subacute form characterized by broncho-pneumonia. The infection in young pigs may also be associated with *Corynebacterium pyogenes*, but swine influenza virus could not be detected. Swine fever occurs, but pasteurellosis may occur in the absence of the swine fever virus.

In rabbits pasteurellosis was characterized by a serous effusion into the body cavities, necrotic lesions in the liver, and haemorrhagic inflammation of the trachea. In fowls there was a haemorrhagic congestion of the serosa and internal organs, catarrh of the respiratory passages, muco-haemorrhagic enteritis and yellowish necrotic foci in the liver.

The cultural characters and biochemical activities of the various strains of pasteurella were studied, and also the degree of specificity in agglutinin production. One of the fowl strains and the strain isolated from turkeys showed a high degree of specificity, being only agglutinated by the homologous sera.

All strains were pathogenic to rabbits, even when the infecting dose was only 1 ml. of a 1 : 50,000,000 dilution of culture.

Immunizing agents consisted of vaccines prepared from agar cultures, the growth from which was emulsified in 10% urotropin, and killed by incubation at 37°C. for 48 hours. For pigs, a polyvalent vaccine was used, to which were added vaccines for *Bacterium coli*, *Corynebacterium pyogenes*, *Pseudomonas pyocyanea* and *Proteus vulgaris*; for the fowl vaccines *Bact. coli* and a local strain of salmonella were added.

Antisera were prepared in cattle by inoculating them with increasing doses of cultures of the avian, rabbit, pig and cattle strains of pasteurella. In rabbits these sera gave some protection against subsequent infection with the pig and cattle organisms, but no protection against the rabbit and fowl strains. In the field results were extremely encouraging both as curative and protective agents in bovine and porcine infections. The serum also proved valuable in the treatment of swine fever.—U. F. RICHARDSON.

KARPOV, S. P., & POPOV, V. M. (1944.) Iksodovye kleshchi kak reservuar vozbuditelya tulyaremii v prirodnykh usloviyakh Zapadnoĭ Sibiri. **[Ixodid ticks as reservoir of tularaemia under natural conditions of Western Siberia.]**—*Med. Parasitol., Moscow.* **13.** No. 2. 75–79. [Abst. in *Bull. Hyg., Lond.* **20.** 323, copied *verbatim.* Signed: C. A. HOARE.] **1706**

The authors report the results of a survey of the distribution of Ixodid ticks in Western Siberia, together with experiments carried out with the object of determining the reservoir and vectors of tularaemia in that country. The ticks were collected in May and June, 1941, from domestic animals (cows, dogs), as well as

from wild rodents and on the ground. The collection comprised 751 adult ticks and 39 nymphs, in addition to which several thousand eggs and larvae bred in the laboratory from "wild" ticks were available. All this material (represented by *Ixodes persulcatus*, *Dermacentor pictus*, *D. silvarum*) was tested for the presence of *Bact. tularense* by inoculation of guineapigs with an emulsion of the ticks, followed by passage through white mice. Tularaemia infection was detected in two batches of *Dermacentor silvarum* and in one of *Ixodes persulcatus*, all of which had been recovered from cattle in two endemic areas of tularaemia. These observations support the view that the ticks, the larval and nymphal stages of which feed on wild rodents, play an important rôle in the epizoology and epidemiology of tularaemia.

MAÏSKIÏ, I. N. (1944.) Tulyaremiïnye vspyshki myshinovo proiskhozhdeniya. **[Tularaemia outbreaks of murine origin.]**—*Gigiena i Sanitariya, Moscow.* No. 7–8. pp. 34–37. [Abst. in *Bull. Hyg., Lond.* **20.** 612, copied *verbatim*. Signed: C. A. HOARE.] **1707**

As a rule, outbreaks of tularaemia of murine origin coincide with periods of mass multiplication of the smaller muriform rodents. This was amply confirmed in some parts of the Soviet Union within the zone of military operations. A considerable part of the harvest could not be gathered or properly stored, with the result that the country was inundated with immense numbers of wild rodents, infesting not only fields and farms but also human dwellings. Under these conditions epizootic outbreaks of tularaemia occurred among rodents and the infection began to spread to human beings, among whom cases of the disease made their appearance.

According to the data collected by the VIEM expedition of 1938–39, the most important epidemiological factor in the spread of tularaemia is the field mouse, *Microtus arvalis*, which acquires the infection from Ixodid ticks. However, epizootics of this disease also occurred in 11 out of 18 species of other mammals examined in southern Russia. Tularaemia is transmitted from rodent to rodent (a) by ectoparasites, (b) by contact between the rodents themselves, (c) by ingestion of food or water contaminated by infected animals, and (d) by cannibalism. In the course of epizootic outbreaks, human beings are liable to acquire an infection (a) by direct contact with infected rodents (alive or dead) or with their excreta, (b) through the alimentary tract (with food or drink), or (c) through the dust rising from agricultural operations with grain and forage. However, contamination of water and food is the most important source of infection, for during epizootics corpses of rodents are found not only in wells but also in the waterworks, while contamination of foodstuffs is a common occurrence.

The following are the most essential preventive measures against tularaemia infection: (1) Strict adherence to all agricultural and economic measures designed to bring about destruction of rodents by creating unfavourable conditions for their existence and by depriving them of food; (2) Numerical surveys of rodents with the view to estimating their rate of multiplication; (3) Systematic destruction of rodents; (4) Protection of houses against invasion and food against contamination by rodents.

Observance of these precautions in certain areas has already resulted in a considerable diminution of human cases.

—. (1944.) **Twenty-fourth annual report of pullorum disease eradication in Massachusetts.**—*Bull. Mass. agric. Exp. Sta.* No. 120. pp. 12. **1708**

This report gives a full account of the testing performed under the pullorum disease eradication scheme. 462 flocks involving 808,845 birds were tested and only 0·11% reacted. This compares favourably with the 1920–21 season in which testing first began; in that season, 108 flocks involving 24,718 birds were tested, the percentage of reactors being 12·5. In discussing the results it is pointed out that annual testing of all birds in the flock is necessary for full control of pullorum disease. Partial testing of flocks, or testing at intervals of more than one year is contra-indicated. During 1943–44, there was an increase in the appearance of infection in flocks previously negative, 17 flocks being thus affected. In only seven of these flocks was it possible to trace the cause; in three, infection was due to the purchase of questionable stock, in two, infection was introduced from an infected supply flock, in one, by inadequate preventive measures and in one through birds sent to a poultry show. A list is given of the measures which should be adopted by poultry keepers for the control of the disease.—T. E. G.

—. (1943.) Deutches Reich. Runderlass des Reichsministers des Innern, betr. Bekämpfung des seuchenhaften Verkalbens (Banginfektion des Rindes). **[Germany: circular concerning control of bovine brucellosis.]** — *Reichsgesundheitsblatt.* **18.** 106–108. **1709**

The circular deals generally with the inoculation of heifers with one of two virulent live vaccines, *viz*, the bile-culture vaccine prepared by the *Behringwerke* and the American strain 19. Instructions are given as to notification, blood tests, the preparation of the vaccines and technique of the vaccination. Eradication by removal of reactors is discussed.—E. K.-N.

SEELEMANN, M., & MEYER, A. (1943.) Zur Standardisierung von Abortus-Bang-Impfstoffen. I. Teil: Untersuchungen über Bestimmung und Festlegung der Keimzahl. II. Teil: Untersuchungen über die Haltbarkeit verschiedener Lebendkulturen. **[Standardization of *Br. abortus* vaccines. I. The number of organisms required. II. Stability of live cultures.]** —*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* July 23rd. 236–239 and Dec. 10th. 425–428. **1710**

I. In view of the fact that *Br. abortus* live vaccines were again being used in Germany for purposes of immunization the authors discussed the necessity of standardization, determining the numbers of living bacteria in vaccines from various sources. Subsequently they examined the decrease over certain periods of time in the numbers of living organisms in various vaccines, demonstrating that vaccines prepared from cultures in liquid media contained smaller numbers of viable organisms than vaccines of the same opacity prepared from cultures on solid media. The authors are of opinion that the number of viable organisms and the virulence required for successful immunization are not yet known.

II. Four vaccines, some made from a single strain and others from a mixture of different strains, were prepared from cultures in solid glycerin-agar media, using buffered saline, buffered saline plus glycerin broth (5 : 1) and glycerin broth only. Their stability was tested over periods of eight weeks by counting the viable organisms and their virulence was tested by mouse and g. pig inoculations. Freshly prepared vaccines kept at 12°–15°C. contained between 2·4 and $4·4 \times 10^9$ viable organisms per ml. Under these conditions no appreciable drop in the numbers of viable organisms or in the virulence occurred during the first two weeks but some deterioration took place during the following two weeks, becoming marked during the last four weeks of the tests. The stability

of the vaccines was improved by the addition of glycerin broth; this is therefore advocated in their preparation.
—E. KLIENEBERGER-NOBEL.

SEELEMANN, M., & HINDERER, G. (1943.) Zur Standardisierung der Agglutinationsmethode für die Abortus-Bang-Diagnose. **[Standardization of the *Brucella abortus* agglutination test.]**—*Arch. wiss. prakt. Tierheilk.* **78.** 302–315. **1711**

Detailed instructions are given for the preparation of suspensions for the aggln. test, for the diluting of sera and for incubation and test readings. The authors point out that in their long experience it has proved of advantage to carry out a flocculation test simultaneously with the aggln. test. They recommend "Sachweh" extract for the flocculation reaction which is slightly more sensitive than the aggln. test.—E. K.-N.

*GOLEM, S. B. (1943.) Recherches sérologiques, d'au point de vue de la brucellose chez l'homme et animaux domestique de notre pays. **[Serological examination for brucellosis of man and domestic animals in Turkey.]**—*Türk. Z. Hyg. exp. Biol.* **3.** 115–116. [In French.] [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 8. 47, slightly amended.] **1712**

To determine the distribution of brucellosis in Turkey, cultures of *Brucella* were tested for agglutination against 2,389 specimens of human and animal sera. The sera were collected in 45 different communities. Of 1,154 human sera tested, 68 (5·9%) agglutinated *Brucella*, indicating that the serum was immunized against this bacterium. In a second test, of 298 sera of ♂♂ sent to the Institute for syphilis diagnosis, 18 (6%) agglutinated *Brucella*, and of 251 sera of ♀♀, 25 (9·9%) agglutinated, suggesting that ♀♀ are more often infected with *Brucella* than ♂♂. Agglutination tests with 759 samples of horse sera showed that 305 (40·7%) agglutinated *Brucella*. Similar tests gave positive sera in 62·5% of mules, 39·1% of beef cattle, 61% of cows, 41·9% of buffaloes, 13·3% of sheep and 50% of goats.

RYFF, J. F., & LEE, A. M. (1945.) **Vibrio fetus in sheep.**—*Amer. J. vet. Res.* **6.** 149–158. **1713**

Cultural studies were made on material obtained from two outbreaks of ovine abortion. In one outbreak, only one out of 290 pregnant ewes aborted, being then isolated for three days. Of the 1,200 ewes in the other flock, 650 aborted foetuses aged six weeks to four and a half months. Isolation and identification of the causal organism were difficult; the authors report weak growth and extreme pleomorphism. Transmission experiments, using culture obtained from the abomasum of an aborted foetus and abomasal contents gave inconclusive or negative results. Attempts to demonstrate the organism in stagnant water supplies available to affected flocks failed. Studies of the growth of an established strain of *Vibrio foetus* are described and a short discussion of the literature is presented.
—G. B. S. HEATH.

LEVIN, O. L., & BEHRMAN, H. T. (1945.) **The problem of nonfluorescent ringworm of the scalp. A warning.**—*J. Amer. med. Ass.* **128.** 350–352. [Abst. in *Bull. Hyg., Lond.* **20.** 613, copied *verbatim*. Signed: J. T. DUNCAN.] **1714**

Hairs of man or the lower animals infected by any species of *Microsporon* yield a bright greenish fluorescence when irradiated with ultra-violet rays passed through a Wood's filter (glass containing sodium-barium silicate and nickel oxide). *Achorion schönleinii* causes a weaker fluorescence, but hairs infected by all other kinds of ringworm fungi, including the trichophytons, are non-fluorescent. Wood's lamp is invaluable for the rapid detection of clinical microsporosis or of carriers of this infection, and, as *Microsporon* species are by far the commonest causes of *tinea capitis*, there is a tendency to make the diagnosis of all cases of *tinea capitis* dependent upon the detection of fluorescent hairs, with the consequence that *Trichophyton* infections may be overlooked. The case of *Trichophyton tonsurans* infection of the scalp, described by the authors of this paper, exemplifies this kind of error and points to the need for adequate clinical, microscopical and cultural examinations of cases of *tinea capitis*.

*ORTIZ, M. (1941.) Sobre un bacilo ácido-alcohol-resistente huésped normal del hombre en Cuba. **[Acid-alcohol-fast bacillus.]**—*Rev. tuberc., Habana.* **5.** 214. [Abst. in *Amer. Rev. Tuberc.* **48.** No. 5. pp. 70–71 of absts., copied *verbatim*.] **1715**

The germ described is a nonpathogenic acid-alcohol-fast bacillus found in the bronchial discharges, saliva and urine of many clinically and roentgenologically normal persons in Cuba. The number of germs present varies according to individuals. The organism is morphologically and tinctorially similar to the tubercle bacillus but nonpathogenic for the guinea pig and the rabbit and apparently for human beings. Report on similar organisms had previously been made by Cummins and Williams in 1933 and Dufourt in 1935. The author suggests the name of *Proactinomyces buccalis* for the germ he has found.

CAVANDOLI, H. E. (1945.) La actinobacillosis bovina en la inspección de carnes. **[Actinobacillosis and meat inspection.]**—*Gac. vet., B. Aires.* **7.** 140–155. **1716**

C. reviews actinobacillosis in cattle with special reference to meat inspection, describing the lesions, histopathology, bacteriology, differential diagnosis and significance to man. Out of a total of 100,000 P.M. examinations performed on cattle, actinobacillosis lesions were found in 400 and actinomycosis in two.

In experimental work, pure cultures of actinobacillus were given to 32 g. pigs by intraperitoneal inoculation and to eight g. pigs and three dogs *via* the alimentary tract; four g. pigs were fed with pus collected from abscesses. No deaths were reported.
—H. G. ARAMBURU.

MAIDANA, V. (1944.) Pietin. Enfermedad de la pezuña de los lanares. **[Foot rot in sheep.]**—*Bol. tec. Direcc. gen. Ganad., B. Aires.* No. 10. pp. 671–677. **1717**

M. reviews the clinical signs of foot rot in sheep, with special reference to its differential diagnosis from foot and mouth disease. In routine flock inspection the two are sometimes confused.—H. G. ARAMBURU.

SEIBOLD, H. R. (1946.) **Systemic blastomycosis in dogs. A report of two cases.**—*N. Amer. Vet.* **27.** 162–164. **1718**

The histological findings on specimens received from two dogs in North Carolina were consistent with those of human blastomycosis, and numerous organisms typical of *Blastomyces dermatitidis* were present in the lesions, but in both cases the material was in an advanced stage of decomposition. In life one animal had fever and respiratory distress, whilst the other had impaired appetite and depression without fever. In the former case a mass of pathological tissue extended from the left kidney, and involved the large and small intestines, tubercle-like lesions were found in the liver, diaphragm and spleen, and the lungs were solidified. In the second animal the lungs only were affected, being studded with small yellowish-grey nodules.

Histological examination of the nodules revealed accumulations of inflammatory cells, histiocytes, lymphocytes and granulocytes and a limited number of binuclear histiocytes and giant cells. Organisms

morphologically similar to *B. dermatitidis* were present in the majority of lesions, either phagocytized or lying free in the exudate. The organisms appeared as large spherules with thick homogeneous walls surrounding a central protoplasmic mass. Some appeared as empty shells. Many were undergoing budding.—U. F. R.

*Hirt, G. (1944.) **[Pneumonomycosis in goslings and turkey poults.]**—*Közl. Összehas. élét- és kórtan Köréből.* **32.** 73. [Abst. from abst. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 133.] **1719**

In an outbreak of pneumonomycosis on a farm of 688 young geese, 1–2 weeks old, there was a death rate of 85% and in another outbreak on a farm of 154 young turkeys 2–6 weeks old there was a death rate of 84%. At autopsy small caseous nodules with red margins were found in the lungs. In the centre of these necrotic nodules a considerable amount of mycelia and spores could be demonstrated. The surrounding lung tissue showed catarrhal pneumonia.—J. Zweig.

Emmons, C. W., Olson, B. J., & Eldridge, W. W. (1945.) **Studies of the role of fungi in pulmonary disease. I. Cross reactions of histoplasmin.**—*Publ. Hlth Rep., Wash.* **60.** 1383–1394. [Authors' summary and conclusions copied *verbatim.*] **1720**

Histoplasmin, blastomycin, coccidiodin, and haplosporangin were prepared by procedures similar to those used in making coccidioidin. Cross reactions between the four antigens were demonstrated.

A dilution of 1 : 100 of histoplasmin gave a positive reaction in guinea pigs with experimental histoplasmosis, blastomycosis, coccidioidomycosis, and haplomycosis.

Thirty-four of one hundred and thirty-six hospitalized persons reacted to both histoplasmin and blastomycin.

The significance of the surprisingly high incidence of positive reactions to histoplasmin and blastomycin in man remains to be determined. We are not at present in a position to evaluate the clinical or epidemiological significance of these positive reactions as they occur singly or together, in view of the demonstrated cross reactions between these antigens.

Baker, R. D. (1945.) **The classification of fungus infections according to form of fungus in tissues.**—*Sth. med. J.* **38.** 272–276. [Abst. in *Bull. Hyg., Lond.* **20.** 438, copied *verbatim.* Signed: J. T. Duncan.] **1721**

The author explains that he is not advocating a new mycological classification but only grouping the fungi as they appear to the histopathologist. His classification is as follows :—

Group I : *Hyphae in Tissues* (*Actinomyces bovis, Nocardia asteroides*).

Group II :– *Spores in Tissues* (*Cryptococcus neoformans, Blastomyces dermatitidis, B. brasiliensis, Histoplasma capsulatum, Sporotrichum schenckii, Hormodendrum* sp. and *Phialophora verrucosa, Coccidioides immitis* and *Rhinosporidium seeberi*).

Group III :– *Hyphae and Spores in Tissues* (*Candida albicans, Aspergillus* sp., *Mucor, Madurella* sp., *Monosporium apiospermum, Trichophyton, Microsporum, Epidermophyton,* and *Malassezia furfur*).

[Possibly this grouping may be of use to pathologists, but the choice of the term "spore" for the actively vegetating parasitic forms of such fungi as *H. capsulatum, S. schenckii* and *C. neoformans* is unfortunate.]

Van Herick, W., & Eaton, M. D. (1945.) **An unidentified pleuropneumonialike organism isolated during passages in chick embryos.**—*J. Bact.* **50.** 47–55. **1722**

The occurrence of a spontaneous infection in chick embryos used for the passage of a filtrable virus is especially important if the agent producing the infection is itself filtrable. The authors report [*V. B.* **15.** 46] the isolation of a pleuropneumonia-like organism which appeared during the passage of the virus of primary atypical pneumonia. There was a sudden increase in the number of deaths of the chick embryos used and lesions other than those due to the virus were noticed on the amnion and embryo. Material from the doubly infected eggs had an enhanced virulence for the cotton rat and lowered virulence for the hamster. The organism was grown in 10% horse serum broth; it could be passed through a Berkefeld N but not through a Seitz filter.

The laboratory animal which appeared most susceptible was the cotton rat, which, when inoculated intranasally, died in 2–3 days with extensive pulmonary consolidation. Seitz filtrates of cultures produced similar consolidation upon inoculation intranasally into cotton rats, but no organisms could be detected in the filtrate by inoculation of eggs. This poisonous agent is not a true toxin, as no antigenic effect could be demonstrated, and it was heat-stable (when tested at 90°C. for 30 min.). Haemagglutination by Hirst's method occurred with the organism, and could be inhibited by rabbit antiserum.

Tests of normal chicken sera, by the inhibition of haemagglutination, demonstrated the occurrence of antibody to the organism in a titre of 1 : 10 or over, in 72% of birds.—J. B. Brooksby.

Parsons, E. I., McCollum, E. V., & Frobisher, M., Jr. (1946.) **The effect of immunization against lactobacilli and acidogenic cocci on the tooth flora of the rat.**—*Amer. J. Hyg.* **43.** 41–48. [Authors' summary copied *verbatim.*] **1723**

Rats from the McCollum rat colony were inoculated with living vaccines of lactobacilli and acidogenic cocci. The numbers of lactobacilli and acidogenic cocci found in the fissures and crypts of the teeth were then compared with those from an equal number of unvaccinated controls on the same diet. No evidence was found that repeated subcutaneous and intraperitoneal injections with lactobacilli and acidogenic cocci had any effect whatever on the numbers of these organisms found in the crypts and the fissures of the teeth of the rats.

Braun, H., & Silberstein, W. (1942.) Über die Bedingungen der Schwefelwasserstoffbildung bei Darmbakterien. **[Conditions of sulphur dioxide formation by intestinal bacteria.]**—*Rev. Fac. Sci. Univ. Istanbul.* Ser. B. Sci. Nat. **7.** 1–22. [In German : Turkish summary.] [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. **34,** slightly amended. Signed : R. W. Rennak.] **1724**

Experiments with various intestinal bacteria growing on nutrient agar showed that peptones and meat broth were favourable substrates for the formation of H_2S, and that anaerobic conditions promoted H_2S formation from cystine, flowers of sulphur, $Na_2S_2O_3$, and Na_2SO_3. Addition of 0·002% cystine, $Na_2S_2O_3$, or Na_2SO_3 to carbohydrate culture media favoured growth and gas formation by intestinal bacteria. $Na_2S_2O_3$ is thought to be the best source of S for pathological forms. Substances serving as sources of H_2S are thought to act as H acceptors and accelerators of fermentation for facultative anaerobes.

Zittle, C. A., Delvin, H. B., Rodney, G., & Welcke, M. (1945.) **Removal of bacterial pyrogens from protein hydrolysates.**—*J. Lab. clin. Med.* **30.** 75–79. **1725**

The bacterial pyrogen content of protein hydrolysates is estimated by determining the minimum

dilution causing a similar temperature rise in rabbits as is caused by 0·01 μg. of a purified pyrogen prepared from *Pseudomonas aeruginosa*. The method is time-consuming and only approximate, since differences have been reported in the reactivity of pyrogens from different bacterial sources.

The removal of pyrogen from aqueous solution or from acid hydrolysates by Seitz filtration is difficult, whilst its removal from protein enzyme hydrolysates, which may be incompletely hydrolysed, is extremely difficult if not impossible.—R. R. A. COOMBS.

See also absts. **1887** (streptococci in milk), **1917** (mastitis), **1769**, **1862**, **1863**, **1888**, **1896** (TB.), **1768** (tularaemia), **1796**, **1856**, **1857**, **1891-1893** (salmonella), **1797** (pullorum disease in turkeys), **1768** (brucella), **1765**, **1766**, **1773**, **1864**, **1897** (clostridia), **1890** (*Oospora lactis*), **1919** (bovine contagious pleuro-pneumonia), **1850-1858** (antibiotics).

DISEASES CAUSED BY PROTOZOAN PARASITES

BRION, A., & BERTRAND. (1944.) Paralysie leishmanienne du chien. [*Leishmania* **infection in dogs.**]—*Bull. Acad. vét. Fr.* **17.** 139–142. Discussion pp. 142–143. **1726**

A case of paralysis of the hind legs in a dog, associated with furfuraceous eczema and thickening and loss of hair of the eyelids, recovered under treatment with "pentastib" (methyl-glucamine-amino-phenyl-stibinate). It is suggested that the paralysis was due to leishmaniasis and as recovery occurred under treatment it follows that leishmanial invasion of the nerve centres does not cause paralysis by the destruction of essential elements, but causes an inhibition of the functions of the tissues, either by the presence of the parasites or by their secretions. In the discussion which followed, CESARI reported a case of leishmaniasis which declared itself after an incubation period of two years. Treatment with "pentastib" led to the regression of the symptoms.—U. F. RICHARDSON.

BERBERIAN, D. A. (1945.) **Cutaneous leishmaniasis (oriental sore). V. Experimental canine cutaneous leishmaniasis.**—*Arch. Derm., Chicago.* **51.** 193–197. [Abst. in *Trop. Dis. Bull.* **42.** 877, copied *verbatim*. Signed: C. M. WENYON.] **1727**

Certain Russian observers, working in areas in which human and canine kala azar occur, have noted that the disease in dogs is frequently associated with cutaneous ulceration, and have rather suggested that purely local lesions in dogs, apart from visceral infection, did not occur. On the other hand observers in places where oriental sore alone occurs have seen cutaneous lesions in dogs and have assumed that these correspond to the localized oriental sore of human beings.

With a view to throwing light on this question the author inoculated ten pups and one adult dog with cultures of *Leishmania tropica*. The material was inoculated intracutaneously into the skin of the ears or the inner surface of the thighs. In addition some of the dogs were inoculated intraperitoneally. In all animals cutaneous lesions containing leishmania in abundance developed at one or more of the sites of inoculation. In due course, when the lesions were well developed and contained numerous leishmania, the animals were killed and careful search for leishmania in the viscera made. In no case was it possible to demonstrate a generalized infection. It seems clear, therefore, that purely local lesions caused by leishmania, and corresponding to oriental sore in man, do occur. The author, while admitting the identity of the parasites in human beings and dogs, suggests that the dog strains be named *Leishmania donovani* var. *canina* and *L. tropica* var. *canina*. [However convenient such a terminology may be, it cannot be admitted, since the varietal names proposed imply that the canine parasites actually differ from those in man. It would be just as convenient and more correct to write (human strain) and (canine strain) after each name.]

BELTRÀN, E. (1944.) Paludismo humano y paludismo animal. **[Human and animal malarias.]**—*Ciencia* [*Mexico*]. **4.** 203–208. [Abst. in *Biol. Absts.* Sect. F. **19.** No. 7. 69, slightly amended. Signed: W. R. ALLEN.] **1728**

A brief history of the discoveries relating to malaria and the malarial organism is followed by brief sections on the spp. of *Plasmodium*, on bird, mammalian and reptilian plasmodia, life-cycles, types of vector mosquitoes, attempts to culture the organism, artificial infections, diagnoses, a summary of the problems unsolved and consideration of methods of attempting their solution.

MANWELL, R. D. (1946.) **Bat malaria.**—*Amer. J. Hyg.* **43.** 1–12. [Author's conclusions copied *verbatim*.] **1729**

A study of the plasmodia of bats made on a series of slides sent from the New Guinea area appears to justify the following conclusions:

1. No reproductive stages of the pigmented series occur in the peripheral blood, and it seems likely that all the developing intraerythrocytic forms are destined to be gametocytes.

2. Pigment-free, extracellular schizonts and segmenters have been found in considerable numbers on a few thin smears of peripheral blood. These produce a very variable number of merozoites, and some of them bear a striking resemblance to exoerythrocytic stages seen in some species of avian malaria.

3. No segmenting forms have been found in smears made of liver, bone marrow, lungs, and spleen.

4. No evidence of periodicity was obtained in the plasmodium of *Dobsonia moluccensis*.

5. It seems likely that what have been called plasmodia in the Chiroptera are in reality more closely related to *Hemoproteus* than to *Plasmodium*, since pigmented reproductive forms do not occur, at least in many cases. It may be that a new genus should be created with characteristics intermediate between the two genera just named.

6. If this conclusion is correct, the most likely vectors of bat plasmodia are not mosquitoes but the parasitic flies of the families Nycteribiidae and Streblidae, since these flies are closely related to the Hippoboscidae, which seem to be the usual vectors of *Hemoproteus*.

7. *Dobsonia moluccensis*, a species of fruit bat, is reported as a host of plasmodia for the first time.

8. Experience with bats of the species just named, and *Pteropus gouldi*, indicates that both these species would make very suitable hosts for the laboratory study of bat malaria. Both are easily kept in captivity.

9. Study of the accounts of bat malaria in the literature indicates that most of the described species are either invalid, or do not belong in the genus *Plasmodium*, since they lack pigment. It seems likely that *Plasmodium melanipherum* Dionisi, 1899, *Plasmodium pteropi* Breinl, 1911, and *Plasmodium epomophori* Rodhain, 1926, are really distinct. In view of the differences in host species and the widely separated parts of the world in which bat malaria has been found,

it may be regarded as very probable that there are many other species of these parasites. However, it is doubtful whether species of plasmodia should be created on the basis of gametocyte characters and presumed host specificity alone.

COWEN, D., & WOLF, A. (1945.) **Toxoplasmosis in the monkey. Acute fatal infection experimentally produced in a young *Macaca mulatta*.—*J. infect. Dis.* 77.** 144–157. [Authors' conclusions copied *verbatim*.] **1730**

Nine *Macaca mulatta*, 1 African green monkey (*Cercopithecus sabaeus*) and 1 baboon (*Papio doguera*) were inoculated with human strains of *Toxoplasma*. One young rhesus succumbed to the infection and showed a toxoplasmic meningoencephalitis, interstitial myocarditis, focal myositis and lesions in the rete testis. This is the first instance of an active toxoplasmosis in a monkey with the production of pathological lesions. In general, monkeys would appear to be relatively resistant to this infection. Four additional monkeys developed positive serum neutralization tests for toxoplasmosis. Three monkeys, including 2 with positive serum neutralization tests, had myocardial lesions which were probably due to toxoplasmic infection, although no parasites were demonstrated in them. Attempts to produce congenital toxoplasmosis by infecting 3 monkeys during pregnancy were unsuccessful.

SAVINO, E., & RENNELLA, E. (1944.) Estudios sobre leptospiras. I. Método para la determinación de leptospirolisinas. II. *Leptospira bonariensis* (n. sp. ?) aislada en las ratas grises de la Ciudad de Buenos Aires. III. Presencia de leptospiras en los perros de la Ciudad de Buenos Aires. IV. Diagnóstico de leptospirosis en la rata gris. V. Primer aislamiento en la República Argentina de dos cepas de *Leptospira bonariensis*, de origen humano (dos casos de enfermedad de Weil). **[Studies on *Leptospira*. I. Method for the demonstration of leptospira lysins. II. *Leptospira bonariensis* (n. sp. ?) isolated from brown rats in Buenos Aires. III. The presence of leptospira in dogs in Buenos Aires. IV. Diagnosis of leptospirosis in brown rats. V. First isolation in the Argentine of two strains of *Leptospira bonariensis* of human origin (two cases of Weil's disease).]**—*Rev. Inst. bact., B. Aires.* **12.** 179–181, 182–189, 215–226, 262–264 & 293–298. [Abst. in *Bull. Hyg., Lond.* **20.** 324, copied *verbatim*. Signed : J. C. BROOM.] **1731**

SAVINO, E., & RENNELLA, E. (1944.) Estudios sobre leptospiras. IX. *Leptospira suis* agente de enfermedad de Weil en la República Argentina. **[Studies on *Leptospira*. IX. *Leptospira suis* as a cause of Weil's disease in the Argentine Republic.]**—*Méd., B. Aires.* **16.** 1349–1351. [Abst. in *Bull. Hyg., Lond.* **20.** 323–324, slightly amended. Signed : H. HAROLD SCOTT.] **1732**

I. Varying concentrations of anti-leptospira serum are incubated with a living culture of the organisms for 20 hours at 30°C. A count is then made under the microscope, using a special cell, of the number of leptospira alive after that period. The percentage of lysis is calculated against controls without immune serum.

II. The authors showed in a previous paper that a series of strains of leptospira could be differentiated into two groups (A and B) by the degree of growth in synthetic medium. In this report is described the results of lysin-absorption tests on these strains. Group A includes a variety of strains from Europe and Asia and Group B strains from South America. All Group A strains are accepted as *L. icterohaemorrhagiae* but they differ from Group B, which also constitutes an antigenic identity. The authors suggest that Group B strains should be accorded specific status as *Leptospira bonariensis*.

III. A total of 390 dogs were investigated and strains of leptospira were isolated from livers. By the authors' lysin-test all appeared to be *L. canicola*. Serum from 317 of these dogs was tested against *L. canicola*, *L. icterohaemorrhagiae* and *L. bonariensis*. Positive results were obtained against *L. canicola* (79 cases, 24·9 per cent.); *L. interohaemorrhagiae* (1 case, 0·3 per cent.); *L. bonariensis* (18 cases, 5·6 per cent.). The latter two species were not isolated in any instance.

IV. Cultures were made from the kidneys of 100 *Rattus norvegicus* and leptospira isolated in six instances. All these strains were shown to be *L. bonariensis*. Serum from these rats (but from none of the others) contained antibodies for this species. No serum contained antibodies for *L. icterohaemorrhagiae* or *L. canicola*.

[The authors have added one more to the increasing number of species or types of leptospira pathogenic to man. It is greatly to be hoped that a complete investigation of the antigenic constitution of leptospira will soon be undertaken to decide the relationship of the widely-distributed *L. icterohaemorrhagiae* to the other species which, on the whole, appear to be limited to certain geographical areas. No doubt new technical methods will be needed in such a study: the lysin-absorption test described by the authors is to be welcomed if it provides fresh information not otherwise obtainable. Otherwise it is difficult to see why such a laborious method should be used instead of the agglutination test—though admittedly the latter has pitfalls for the unwary. Unfortunately the authors have not reported the results of parallel tests.]

IX. In 1943 the authors published a new medium for isolation and cultivation of *Leptospira*, but diagnosis in the series here recorded was made by serum reactions. In the present article they refer to seven outbreaks [they use the term "outbreak" if there is only one case]. They speak first of the outbreak at Alejandro, Córdoba, reported by Sodini (1944) when some fifty cases occurred in 15 days and there was an epizootic among swine at the same time. BALBOA later investigated these and found that all of the patients had bathed in the Rio Quarto and the present authors isolated *Leptospira suis* from the local pigs. In each of the outbreaks mentioned, sera of patients were tested against *L. icterohaemorrhagiae*, *L. canicola*, *L. bonariensis*, *L. suis* and *L. hyos*. The outbreaks referred to are: (1) That of Haedo, Buenos Aires, in 1941, three cases. Three and a half years later their sera lysed *L. suis* in titres of 1/50 to 1/500. (2) A case at Pueblo Torres, Córdoba, in 1943; 40–50 days after his illness began his serum lysed *L. icterohaemorrhagiae* at 1/12,000 and *L. suis* at 1/60,000. Examination of cattle [carcasses ?] under this patient's charge in the cold-storage room revealed *L. suis*. (3) The Alejandro outbreak referred to above. Of 45 patients the results of serum tests in eight are given in a table. One gave lysis of *L. icterohaemorrhagiae* at 1/500 and of *L. suis* at 1/2,500; the others lysed the latter only at titres ranging from 1/250 to 1/12,500. (4) The Tandil outbreak when eleven of a group of priests fell ill a few days after bathing in a pond receiving water from an adjacent stream. One of them died. Eight of the sera were tested six months later and they reacted at titres of 1/500 to 1/2,500. Among a group of novices (menores) who camped on the same site, one, 18 years of age, fell ill five days after his return; 27 days later his serum reacted at 1/50 with *L. icterohaemorrhagiae* and 1/2,500 with *L. suis*. (5) Outbreak of Carlos Pellegrini, Santa Fé, two cases. Sera lysed *L. icterohaemorrhagiae* and *L. suis*, the former at 1/250 in both cases and the latter at 1/6,250 and 1/12,500 respectively, but were negative with *L. canicola*, *L.*

bonariensis and *L. hyos.* (6) Santa Lucia outbreak, Buenos Aires, three cases. The serum of one of the patients,–65 days after the onset of his attack, lysed *L. suis* at 1/250; another, 112 days after the onset, did the same, and the third after the 111th day lysed *L. icterohaemorrhagiae* at 1/50 and *L. suis* at 1/500. Two of the three had bathed in a stream, *El Toba*, 14 and 17 days before and the third had drunk of the water 17 days before. Nearby was a piggery and an epizootic was prevailing there and many died. (7) Lastly, a man working at a cold-storage plant fell sick and his serum lysed *L. icterohaemorrhagiae* at 1/100 and *L. suis* at 1/50,000. He had worked at the municipal slaughterhouse and cold-storage and for a year had been employed in washing and depilating (cepillado) the hides of recently slaughtered cattle.

See also absts. **1800**, **1898**, **1921** (trypanosomiasis), **1866** (plasmodia), **1867-1869**, **1899** (protozoa).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

MICHELSEN, E. (1945.) Et antagelig af en Virus-variant foraarsaget Mund- og Klovesyge-Tilfaelde paa Langeland. **[Foot and mouth disease in Langeland, Denmark, evidently caused by a virus variant.]** —*Maanedsskr. Dyrlaeger.* **57.** 103–106. **1733**

M. records an outbreak of foot and mouth disease at Langeland, where the disease was until then unknown and no cattle had been immunized. A series of tests was undertaken, the first revealing weak O-immunity and no antibodies for type A virus. Serum titration tests five months later gave A antibodies, leading to the conclusion that disease was due to virus of variant type Ao, this being the first case in Denmark of disease caused by an atypical virus. As first tests gave O antibodies but no A, an Oa type might be expected, but it must be remembered that demonstrable quantities of A antibodies disappear more rapidly from the blood than O antibodies, and that the strength of latent immunity need not be in relation to the antibodies observed. In later tests there was immunity towards two types, of which one could not be serologically demonstrated. The author emphasizes the necessity of carrying out serum titration before other tests.—M. E.

BLANC, R. A. (1944.) Acción de los diferentes factores sobre la evolución de las lesiones aftosas. **[Effect of various factors on the development of foot and mouth disease lesions.]**—*Bol. tec. Direcc. gen. Ganad., B. Aires.* No. 10. pp. 680–687. **1734**

B. discusses briefly the influence of bacteriological, physical and chemical factors on the development of lesions of F. & M. disease.—H. G. ARAMBURU.

ROSSI, F. A., & CAMPION, R. L. (1944.) Inmunización de ochenta mil animales con la vacuna antiaftosa tipo Waldmann. **[Immunization of 80,000 animals with Waldmann type foot and mouth disease vaccine.]**—*Gac. vet., B. Aires.* **6.** 214–221. **1735**

The authors describe the results obtained from the vaccination with Waldmann's vaccine of 55,000 cattle, 24,000 pigs and 1,000 sheep, most of which were on Argentine farms.

No vaccine was used after 15 days. Calves below 200 kg. in weight received 30–40 ml. and adults 50–60 ml.; young pigs received 10 ml., those of medium size 20 ml. and adults 30 ml.; sheep under six months received 10 ml., yearlings 20 ml. and adults 30 ml.

1% of the cattle vaccinated later developed F. & M. disease, but no failures were reported four months later among pigs, most of whom had been pregnant at the time of vaccination. Owing to the small number of sheep dealt with no conclusions are mentioned.

—H. G. ARAMBURU.

SOLOVIEFF, P. (1943.) Réaction de conglutination dans la fièvre aphteuse. **[Conglutination reaction in foot and mouth disease.]**—*Rev. zootéc.* **30.** No. 251. 19–26. [In French.] **1736**

S. describes his technique for carrying out the conglutination test and its application to the diagnosis of F. & M. disease. All sera used were diluted 1 : 10. The complement was that of the horse, and inactivated bovine serum supplied the conglutinin.

The sera of 1,329 bovines, pigs, g. pigs, horses, rabbits and sheep (some normal, some hyperimmune to the virus of F. & M. disease and some "reconvalescent") were examined by the conglutination test for a reaction with the homologous virus antigen. 390 of these were also examined by the usual complement-fixation test.

The results seemed very satisfactory. There were less doubtful reactions than with the usual c.-f. test and the serological application of the conglutination reaction seemed a reliable method for establishing the immunity of an animal to a particular virus type of F. & M. disease.—R. R. A. COOMBS.

*WILLS, O. E. (1944.) Observaciones sobre vacunación antirrábica en los perros. **[Antirabic vaccination of the dog.]**—*Bol. Inst. Nacion. Hig. Samper Martinez.* **12.** 9–13. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 64., slightly amended. Signed: WALTER ORNSTEIN.] **1737**

Five methods of preparing vaccines are given. The one used by the Inst. Nacional de Higiene is prepared according to the method of Kelser. The virus is inactivated with chloroform. This method is used because it was found superior to other methods of preparing the vaccines in that, so prepared, they afford a higher degree of protection and conserve their antigenic properties longer and absorb more rapidly. The method is based on the studies of Schoening, and with the cooperation of the U.S. Department of Agriculture. The dose used is 10 ml. in large dogs, and 5 ml. in small dogs. A second dose of the same amount is given six days later, to augment the immunity. One dose is given each year thereafter, to maintain the immunity. To achieve a successful campaign against rabies, the following rules must be adhered to: (a) antirabies vaccination in two doses should be obligatory; (b) the animal should be revaccinated once a year; (c) and dogs bitten should undergo treatment, if the owner is opposed to sacrificing the dog. They should also remain in quarantine for at least six months.

TEIXEIRA, O. (1944.) Variola ovina e gafeiração. **[Variola in sheep and vaccination.]**—*Rev. Med. vet., Lisboa.* **39.** 83–90. **1738**

T. describes his experience in immunizing sheep against pox by variolation. Altogether, 1,404 sheep were vaccinated by the intradermal injection of 0·05–0·1 ml. of lymph [method of preparation not given] on the inner surface of the ear. There were only three fatalities among the 160 lambs vaccinated. These were the progeny of three unvaccinated ewes, suffering from pox. Only six of the adult animals died, four of them within three days of vaccination.

In vaccination it is important to choose only the healthy animals, and if in addition to vaccination

attention is paid to general hygienic measures, the results will be highly successful.—I. W. Brocklehurst.

*Sigel, M. M. (1944.) **A study of the antigenic relationship of several strains of human and swine influenza viruses.**—*Thesis, Ohio.* [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 42–43, slightly amended. Signed: A. D. Moinat.] **1739**

Using the red cell agglutination-inhibition test, eight strains of influenza virus were compared and grouped. A second injection of an inactivated virus into chickens tended to widen the zone of immunity to the closely related virus strains. Some increase in the antigenic specificity was apparently obtained by several passages of the highly diluted virus through successive egg cultures. One virus was shown to inhibit the growth of another when they were simultaneously inoculated into a culture. Antisera from ferrets or chickens were found to be similar in reaction.

—. (1946.) **The periodicity of influenza. [The Commission on Acute Respiratory Diseases, Fort Bragg, North Carolina.]**—*Amer. J. Hyg.* **43.** 29–37. [Summary copied *verbatim.*] **1740**

The 16 widespread epidemics of influenza which have occurred in the United States between 1920 and 1944 can be accounted for on the bases of two specific recurrent infections. Influenza A appears to have a cycle of 2 to 3 years and influenza B a cycle of 4 to 6 years. There is no indication that other influenza viruses have caused widespread epidemics in this country during the past 25 years. On the basis of this formulation, the probability of occurrence of future epidemics within certain time limits has been forecast. It has been suggested that the balance between immune and susceptible individuals in the population is the dominant factor which determines the occurrence of influenza epidemics.

Tovarnizky, V. I., & Chalkina, O. M. (1944.) **Purification and concentration of influenza virus.**—*C.R. Acad. Sci. U.R.S.S.* **42.** 194-195. [In English.] [Abst. in *Bull. Hyg., Lond.* **20.** 161, copied *verbatim.* Signed: M. van den Ende.] **1741**

Influenza-infected lungs are emulsified in water saturated with calcium sulphate (gypsum). Ethyl alcohol is added to a concentration of 30 per cent. (by volume). The procedure is carried out in the cold. The precipitate which forms carries down all the virus, which can then be recovered by centrifugation. About 75 per cent. of the lung proteins are removed by the first precipitation. With two successive treatments the virus can be freed of 93 per cent. of the lung proteins without appreciable loss of virus activity.

Knight, C. A. (1946.) **The preparation of highly purified PR8 influenza virus from infected mouse lungs.**—*J. exp. Med.* **83.** 11–24. [Author's summary copied *verbatim.*] **1742**

Highly purified preparations of PR8 influenza virus were obtained from perfused, infected mouse lungs by a combination of methods involving adsorption of the virus on and elution from chicken red cells and differential centrifugation. Such preparations were found to possess 50 per cent. infectivity end-points at 10^{-11} to $10^{-11.8}$, and 10^{-13} to $10^{-14.3}$ gm. of nitrogen in mice and in chick embryos, respectively. A sedimentation constant of 683 S was obtained for the material and electron micrographs revealed essentially spherical particles about 100 mμ in diameter. The material was isoelectric at pH 5·4 and chemical analyses on several of the preparations indicated the presence of 10·1 per cent of nitrogen, 1·06 per cent. of phosphorus, 6·2 per cent of carbohydrate and about 33 per cent of lipid. Positive tests were obtained for both ribonucleic acids. The virus was precipitated strongly by antiserum to purified PR8 virus obtained from the allantoic fluid of infected chick embryos and this serum inhibited the agglutination of red cells by the mouse virus to a dilution of about 40,000.

In general, the properties of the virus isolated from infected mouse lungs were found to coincide with those of the virus obtained from the allantoic fluid of infected chick embryos.

Shahan, M. S., & Giltner, L. T. (1945.) **A review of the epizootiology of equine encephalomyelitis in the United States.**—*J. Amer. vet. med. Ass.* **107.** 279–288. **1743**

This authoritative review should be consulted in the original by those interested. The importance of the disease is emphasized by the estimate that at least one million cases involving the loss of 300,000 animals occurred in the United States during 1930–44. The incidence of the disease reaches epizootic proportions in June and the greatest numbers of cases are recorded in July, August and September. The insect vectors involved and the reservoir of the virus during the winter, when the disease is uncommon, are discussed, attention being drawn to the possibility of passage of the virus through ticks. The frequent occurrence of antibodies in the sera of horses without symptoms, suggests that many animals infected do not develop the disease. The distribution of the Eastern and Western strains is no longer regular, as there is a considerable area in which both types have been reported. The possibility of other neurotropic viruses, or of non-specific encephalitis must be remembered in the diagnosis.

In the control of the disease, vaccination plays a most important part. A vaccination programme must take into account the necessity of double doses of vaccine given intradermally before the disease appears and the maintenance of stability of the vaccine by storage in the refrigeration. It is said that at present 75% of the vaccine is given after the disease has appeared. The type of virus likely to be encountered should be known, although a bivalent vaccine may be used if there is doubt as to the prevalent type.—J. B. Brooksby.

Hammon, W. McD., & Reeves, W. C. (1946.) **Western equine encephalomyelitis virus in the blood of experimentally inoculated chickens.**—*J. exp. Med.* **83.** 163–173. [Authors' summary and conclusions copied *verbatim.*] **1744**

Chickens inoculated subcutaneously with 0·2 c.c. of a 10^{-2} to 10^{-7} dilution of Western equine mouse brain virus had the virus in the blood serum between the 12th and the 48th hour in most instances. The fowls showed no signs of illness.

Viremia could be induced regularly in chickens by inoculating subcutaneously the least amount of virus which would produce encephalitis in the mouse when inoculated by the intracerebral route.

Even the minimal infecting dose for a chicken led to such multiplication of the virus that it was detectable in the serum in a 10^{-6} dilution. Moreover, a minimal infecting dose appeared to result in a longer period of viremia than was produced by a larger dose.

Virus has not been found to persist for more than 3 days after inoculation in any organ of the chicken tested for it and usually it did not persist over 2 days. Antibodies were present in the blood within at least 15 days after inoculation.

It is concluded that chickens may serve as sources of infection for mosquitoes or other blood-sucking ectoparasites for short periods of time after the infecting bite of a similar invertebrate vector. There is no evidence that the chicken serves as a latent carrier of the virus.

No virus could be found in the blood of 2 inoculated calves, and virus has not been demonstrated regularly or with the same ease in the blood of horses or of men, as it has in that of chickens. It seems unlikely therefore that large mammals serve frequently as sources for mosquito infection.

These experimental data on fowls and mammals correlate well with other epidemiological and laboratory findings, in particular with the feeding preference of the mosquitoes found infected in epidemic areas.

CHUMAKOV, M. P., MIRONOV, V. S., PETROVA, S P., ORLOVA, N. N., & SHLUGER, E. G. (1944.) Izuchenie ul'travirusnykh entsefalitov. Soobshchenie IV. Zarazhennost' virusom entsefalita kleshcheĭ Ixodes persulcatus Sch. v raznykh raĭonakh SSSR. **[Studies in virus encephalitis. IV. Infection of *Ixodes persulcatus* with encephalitis virus in various districts of the U.S.S.R.]**—*Med. Parazitol., Moscow.* **13.** 83–89. **1745**

CHUMAKOV, M. P., & NAĬDENOVA, G. A. (1944.) Izuchenie ul'travirusnykh entsefalitov. Soobshchenie V. Kleshch Ixodes ricinus kak perenoschik kleshchevovo (vesenne-letnevo) entsefalita. **[Studies in virus encephalitis. V. *Ixodes ricinus* as a vector of tick (spring-summer) encephalitis].**—*Ibid.* 89–93. **1746**

[Absts. in *Bull. Hyg., Lond.* **20.** 533, slightly amended. Signed: D. J. BAUER.]

IV. Between 1939 and 1943, ticks collected from the Urals, E. and W. Siberia, Karelia, and the Leningrad, Kalinin and Smolensk areas, were examined for the presence of the virus of spring-summer encephalitis. The most frequent species was *Ixodes persulcatus*, except in the west, where *I. ricinus* predominated. The presence of virus in the ticks was tested by injecting mice with an emulsion of ground-up ticks, and by allowing ticks to bite mice. Virus was isolated from two groups of 69 and 200 fasting ticks collected in the Molotov district; two other groups of 10 fasting and 14 half-replete ticks contained no virus. Groups of 2 to 20 ticks were also fed on mice; seven of nine mice died, four with symptoms of encephalitis, and passage was successfully carried out in six cases. To obtain positive results by this method the authors recommend that at least 10 ticks should be used and allowed to bite for four to five days. In addition to this spontaneous infection of adult ticks in early summer, virus was also isolated from nymphs obtained from wild animals at the end of the season; seven strains of virus were isolated from nymphs caught on chipmunks, hazel-hens, wild mice and thrushes. Virus was also found in four batches of larvae derived from female ticks collected in 1939 in the Far East, E. Siberia (Krasnoyarsk) and W. Siberia (Tomsk). Ticks of both species (*persulcatus* and *ricinus*) were collected in Karelia in 1940; four strains of virus were isolated from mixed specimens and one strain from *I. ricinus* alone.

V. Experiments were carried out in 1940 to investigate the presence of the virus of spring-summer encephalitis in ticks of the species *Ixodes ricinus*; 12,500 were collected from localities in White Russia (Mogilev, Minsk, Brest-Litovsk). Emulsions of ticks were injected into mice, and ticks were allowed to bite mice. The virus was isolated three times from groups containing up to 316 ticks, twice from 10 mice each bitten by up to 15 nymphs and three times from 27 mice, each bitten by larvae, and nymphs raised from eggs of ticks found on cows. Negative results were obtained from 10 tick emulsions and 12 biting experiments. Thirty-two bovine sera collected in the same area contained neutralizing antibodies to the far eastern strain of virus, and virus was isolated from the brains of six cows killed near Breat-Litovsk. Endemic foci are therefore present in the west, with *I. ricinus* as vector; the latter, however, is less often infected with the virus than *I. persulcatus*, and bites man less frequently.

CASALS, J., & OLITSKY, P. K. (1945.) **Enduring immunity following vaccination of mice with formalin-inactivated virus of Russian spring-summer (Far-Eastern, tick-borne) encephalitis. Correlation with serum-neutralizing and complement-fixing antibodies.**—*J. exp. Med.* **82.** 431–443. [Authors' conclusions copied *verbatim*.] **1747**

A single course of two intraperitoneal injections of formalin-inactivated virus of Russian spring-summer encephalitis induced in albino mice a solidly immune state which endured almost throughout life. Active virus is therefore not essential for the production of a high degree of lasting immunity. The immune response to vaccination consists of resistance to peripherally introduced active virus and development of circulating antibody.

A correlation has been found to exist throughout the long period of the immune state between the titer of neutralizing antibody, as determined by the intraperitoneal method described, and the degree of immunity to peripherally introduced active virus.

Thus laboratory tests for the immunizing power of a vaccine suggest themselves, to be carried out by an estimation in vaccinated mice of (a) immunity to peripherally inoculated active virus, and (b) serum virus-neutralizing antibody determined by the intraperitoneal method.

The rôles as indicators of immunity in vaccinated mice of complement-fixing antibody in the serum, of the intracerebral challenge dose of virus, and of the intracerebral method for testing neutralizing antibody are discussed. Finally, if the immune response of man to vaccination with formalin-inactivated virus of Russian spring-summer encephalitis follows the pattern of the response of mice as here described, and if the correlation of neutralizing antibody with immunity to peripherally introduced virus applies to man as to mice, then possibly the degree of immunity in human beings following vaccination can be appraised by a peripheral test for neutralizing antibody in the serum.

DUFFY, C. E., & STANLEY, W. M. (1945.) **Studies on the biochemical, biophysical, and immunogenic properties of Japanese B type encephalitis virus and vaccines.**—*J. exp. Med.* **82.** 385–410. [Authors' summary copied *verbatim*.] **1748**

Studies on the biochemical, biophysical, and immunogenic properties of Japanese B type encephalitis virus and vaccines have been made in order to determine whether a purified vaccine suitable for human use could be obtained by means of differential centrifugation of extracts of infected mouse brains. Studies were also made on extracts of normal mouse brains. It was found that extracts of normal as well as of infected mouse brains contained fairly large amounts of several components of high molecular weight.

Components having sedimentation constants near 5 and 40 Svedberg units were found in extracts of infected brains. However the rates of sedimentation of the different components were so similar that it was found impossible, from a practical standpoint, to secure a vaccine consisting largely of virus by means of differential centrifugation.

It was also found that a considerable portion of virus was lost or destroyed in the centrifugation process so that it was impossible to secure an effective degree of concentration of immunogenic potency. Although

vaccines possessing about twice the immunogenic potency of the starting material were obtained, it was concluded that it was not practical to purify and concentrate Japanese B type encephalitis virus in infected mouse brain extracts by means of differential centrifugation for the production of a vaccine on a large scale. The optimum pH stability range of Japanese B type encephalitis virus activity was found to be near pH 8·5. The virus is inactivated fairly rapidly at pH 7 and very rapidly at more acid reactions. The virus is inactivated rapidly near pH 10.

Extracts of infected mouse brains with buffers near pH 8 containing disodium phosphate were found to possess slightly higher titers than saline extracts near pH 7. However, vaccines prepared from such extracts were found to possess essentially the same immunogenic potency, hence, although extraction at the more alkaline reaction may perhaps remove more active virus, there was no indication that more immunogenic material was removed at the more alkaline reaction.

The use of different diluents in the titration of virus activity and the use of different agents in the preparation and storage of virus suspensions were investigated. It was found that low titers were obtained when Ringer's solution, phosphate buffer at pH 7, or saline-phosphate buffer at pH 8·2 were used as diluents but that high titers were obtained when 10 per cent rabbit serum in saline or in phosphate buffer, 10 per cent skim milk in saline or in phosphate buffer, or 1 per cent arginine at pH 8·3 were used. Undiluted skim milk adjusted to pH 8·4 was found to be as satisfactory as undiluted rabbit serum for the preparation of infected brain suspensions for storage at −70°C. A satisfactory neutralization test was conducted with virus stored in undiluted skim milk at −70°C. and subsequently diluted with 10 per cent skim milk in saline. The demonstration that skim milk can be substituted for rabbit serum in the storage, titration, and neutralization tests of Japanese B type encephalitis virus is of practical importance, for skim milk is more convenient to prepare and more readily available in many localities.

CILLI, V. (1943.) Il virus neurotropo della peste equina e suo impiego a scopo vaccinale. **[The neurotropic viruses of horse sickness.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara*. **3**. Reprint pp. 72. [English summary.] **1749**

The importance of horse sickness in Eritrea is discussed and figures are given of the equine losses in recent Italian campaigns in this area; these sometimes reached 50% of the animals. In Eritrea there is no altitude limit to the disease which occurs equally in the hills and lowland plains.

A neurotropic virus was established in g. pigs and in later passages this assumed a "fixed" character with a reaction lasting 4–6 days. The virus produces a degenerative necrosis in g. pigs, affecting the liver, spleen, stomach, muscles and the neurones of the cerebrum and cerebellum, but its presence was demonstrated only in the central nervous system.

The g. pig neurotropic virus could be safely inoculated subcutaneously into horses and mules after 55 g. pig passages in the case of one strain and 43 passages in the case of the other strain. The filtrability of the virus, its behaviour on centrifugation and its resistance to heat, light and chemicals were investigated, it being found that suspended in normal saline solution and glycerin it would survive 80 days at room temperature.

The g. pig virus was used successfully for the immunization of horses and mules by the subcutaneous inoculation of 10 ml. of a 1 : 100 to 1 : 1,000 suspension in glycerinized saline, the injection being repeated twice at intervals of a week. Vaccination never had fatal results, but a few cases of immunity breakdown occurred upon exposure to natural infection.—U. F. RICHARDSON.

CILLI, V., & COCEANI, A. (1942.) Saggi di vaccinazione contro la peste bovina con crema cloruro sodica Petragnani. **[Vaccination against rinderpest with spleen emulsion treated with sodium chloride.]**—*Boll. Soc. ital. Med. Ig. trop.* (*Sez. Eritrea*), *Asmara*. **1**. No. 4. Reprint pp. 7. **1750**

A calf infected with rinderpest was bled to death at the stage when the virus was present in the blood, part of the spleen pulp was ground up with pure sodium chloride and another part was ground up without any additional substance. These preparations were dried for a week over sulphuric acid at 2°C., and then kept in a refrigerator.

Batches of five calves were inoculated with the saline cream vaccine 13, 24 and 51 days after its desiccation; 12 days later they were tested for immunity by the inoculation of virulent blood. The dried splenic material was also inoculated into calves on the 13th, 24th and 51st days. No reaction occurred in the calves vaccinated with the salted spleen material. Eleven of these animals reacted mildly and two severely to the later immunity test, but all recovered. Eight out of 13 calves reacted to the inoculation of dried spleen powder, and three died of rinderpest. The remaining five animals resisted the immunity test.

It is concluded that the saline cream vaccine conferred some immunity, but further work as to its value is required. The survival of the rinderpest virus in dried spleen for 58 days is ascribed to the low temperature of the desiccation.—U. F. RICHARDSON.

SCHANG, P. J. (1944.) Control de algunos factores en la imunización contra la peste porcina. **[Control of various factors in immunization against swine fever.]**—*Gac. vet., B. Aires*. **6**. 222–234. **1751**

In a general survey of immunization against swine fever, S. states that transplacental immunity has been detected in piglets up to 45 days after birth and that it is not advisable to immunize before the animal is three months old. Rickets and parasitic infestations do not hinder the development of immunity but immunization of animals so affected is not advisable because of the high mortality rate. Pregnant animals may be immunized without danger provided that they are handled gently. The normal grain ration should be maintained after immunization and fresh alfalfa is recommended; there is no danger from over-feeding but intestinal constipation must be avoided. The immunity does not vary greatly according to the dose employed:—H. G. A.

HORSFALL, F. L., Jr., & CURNEN, E. C. (1946.) **Studies on pneumonia virus of mice (PVM). I. The precision of measurements in vivo of the virus and antibodies against it.**—*J. exp. Med.* **83**. 25–42. [Authors' summary copied *verbatim*.] **1752**

This study on pneumonia of mice (PVM) was carried out in order to obtain as accurate data as possible on the degree of variation which may be expected in titrations of the virus or of antibodies against it *in vivo*. It is believed that the knowledge gained will facilitate further investigations on this latent pneumotropic virus and make possible a more exact assessment of the significance of experimental results obtained with the agent.

The reproducibility of 50 per cent maximum score titration end points with PVM in mice is such that the chances are 19 out of 20 that a difference of 1·084 log units (*i.e.* a twelvefold difference) in the end points obtained in two separate titrations is significant. The

reproducibility of 50 per cent maximum score serum dilution end points in neutralization tests with PVM in mice is such that the chances are 19 out of 20 that a difference of 0·626 log units (*i.e.* a fourfold difference) in the end points obtained with two sera against similar amounts of virus is significant.

It was found that there is a linear exponential relationship between the serum dilution end point and the quantity of PVM used in a neutralization test. This relationship appears to be identical with immune serum obtained from different animal species, and appears also to be identical to the linear relationship described previously in similar studies with influenza A virus.

JUNGEBLUT, C. W., & DALLDORF, G. (1946.) **Epidemiological and experimental observations of poliomyelitis in New York City (1943-1944).**—*Amer. J. Hyg.* **43.** 49–64. [Authors' summary and conclusions copied *verbatim.*] **1753**

I. A study of the distribution of cases of poliomyelitis in New York City during one full interepidemic phase has furnished no clear-cut evidence of the existence of persistent foci or other local factors, characteristic of environment, that may favor spread of the disease.

2. Among a total of 301 live rodents, including 290 house mice (*Mus musculus*) and 11 rats (*Rattus norvegicus*), which were trapped in the Greater New York area and examined for the carriage of murine poliomyelitis virus, 4 specimens of mouse brain (3 from individual mice and one from a pool of 13 mice) were found which contained an agent capable of producing encephalomyelitis in albino mice. In two instances the causative agent could not be transmitted beyond the first or third successive mouse passage. From the other two specimens two viral strains (NY65 and NY Pool II) were isolated which have been maintained in unbroken mouse passage.

3. On the basis of their properties (symptomatology, pathology, potency, host range) and serological characteristics, the murine strains NY65 and NY Pool II were identified as members of the poliomyelitis group of viruses.

4. The epidemiological implications of these findings are discussed and the conclusion has been reached that virus-harboring house mice do not function as a source of poliomyelitic infection for man in an urban environment.

KESSEL, J. F., MOORE, F. J., & PAIT, C. F. (1946.) **Differences among strains of poliomyelitis virus in *Macaca mulatta*.**—*Amer. J. Hyg.* **43.** 82–89. [Authors' conclusions copied *verbatim.*] **1754**

Strains of poliomyelitis virus differ in virulence for *Macaca mulatta* when inoculated by the intracerebral route. The magnitude of these differences suggests the possibility that there may be strains of poliomyelitis virus capable of causing disease in man and essentially incapable of infecting *Macaca mulatta* when inoculated by the intracerebral route. Antigenic differences of a marked degree exist between different strains of poliomyelitis virus as judged by cross-neutralization and cross-immunity tests. Qualitative as well as quantitative conclusions concerning the antigenic relationship of virus strains may differ when based upon resistance to reinoculation as opposed to the development of neutralizing antibodies. Further progress in this field depends on the development of new techniques of investigation.

HAVENS, W. P., Jr., PAUL, J. R., VAN ROOYEN, C. E., WARD, R., DRILL, V. A., & ALLISON, N. H. (1945.) **Human transmission of infective hepatitis by the oral route.**—*Lancet.* **248.** 202–203. [Authors' conclusions copied *verbatim.*] **1755**

The sum total of these latest results indicates, so far, that in cases of infective hepatitis the virus or icterogenic agent is *in the faeces*, and that the disease can be produced in man by feeding such material in capsules or by spraying it into his nasal and pharyngeal passages. Similarly the disease can be produced by feeding *serum* from cases of infective hepatitis. In these feeding cases, both in the series reported by MacCallum and Bradley (1944) and those in the series by Havens et al. (1944), the incubation periods have on the average been about 28 days, being shorter than the incubation periods of typical serum jaundice.

From these experiments one main feature becomes apparent: there is justification for suspecting that the intestinal-oral circuit is part at least of the natural route of spreading infective hepatitis. Others have already indicated that their practical experience with epidemics of infective hepatitis among British and American troops in the Middle East is in keeping with this idea.

HAVENS, W. P., Jr. (1946.) **Period of infectivity of patients with experimentally induced infectious hepatitis.**—*J. exp. Med.* **83.** 251–258. [Author's summary copied *verbatim.*] **1756**

Serum and stools obtained in the pre-icteric phase of one patient, and pooled specimens of the same materials from 5 patients with experimentally induced (by feeding) infectious hepatitis produced the disease in 10 out of 15 human volunteers following feeding or parenteral inoculation.

Pooled specimens of urine and nasopharyngeal washings from 5 patients, obtained in the acute phase of infectious hepatitis when virus was proven to be in the stool and serum, were not demonstrably infectious when fed and given intranasally to 6 volunteers.

Serum obtained in the midincubation period of one patient with experimentally induced infectious hepatitis failed to produce apparent infection when inoculated parenterally into 3 human volunteers. This is in contrast to the situation in homologous serum jaundice in which "virus" has been demonstrated in the sera of volunteers during the incubation period.

Serum and stools obtained from one patient and pooled specimens of stools from 5 patients 25 to 31 days after onset of experimental infectious hepatitis failed to produce apparent infection in 10 human volunteers.

No appreciable difference was detected in length of incubation period following the parenteral administration of widely different amounts of the same strain of "virus".

FINDLAY, G. M., & WILLCOX, R. R. (1945.) **Infective hepatitis. Transmission by faeces and urine.**—*Lancet.* **249.** 594–597. **1757**

Infective hepatitis was successfully transmitted to men in conditions where accidental contact with a sporadic case was unlikely. Of the faeces of nine donors, five samples (0·6 g.) produced the disease in 11 of 33 volunteers to whom they were fed. Five of 17 recipients of 30–50 ml. of urine from some of the same donors had definite icteric symptoms. The incubation period was 17–48 days. A Seitz filtrate of faeces from one donor produced the disease in two out of six recipients when given orally.—J. B. BROOKSBY.

OLITZKI, L., & BERNKOPF, H. (1945.) **A precipitation test in infective hepatitis.**—*J. infect. Dis.* **77.** 60–67. **1758**

In this precipitation test the antigen used was an alcoholic extract of dried liver or spleen, to which cholesterol was added. It could be prepared equally well from normal or diseased liver. 94 of 102 sera from infective hepatitis patients gave a positive reaction

and there were 64 false positives in a series of 330 other sera. Nearly all these non-specific reactions could, however, be eliminated by heating the serum at 60°C. for 15 min. Infective hepatitis sera gave positive reactions with a dose of 0·02 ml. serum, while other sera were always negative at 0·05 ml. or less.—J. B. B.

NYKA, W. (1945.) **A histological study of the lungs of mice infected with typhus rickettsiae.**—*J. Path. Bact.* **57.** 317–324. **1759**

Although mice have been widely used during the past six years for the passage of typhus rickettsia, N. could find no report of histological study of the lesions.

The intranasal inoculation of rickettsia results in a broncho-pneumonia, the degree of consolidation varying from complete, in mice which die, to slight consolidation of the upper part of the lung, and congestion of the remainder. The consolidation may be brought about by oedema, or by actual swelling of the alveolar cells with desquamation. Changes in the bronchioles vary from only slight congestion to acute catarrh.

Examination for rickettsia was made in sections stained by a method previously described by N. in 1944 or by immersion for 30–60 min. in 1 : 10,000 aqueous methyl violet followed by differentiation in weak acetic acid (2 drops of glacial acetic acid in 100 ml. water) and counterstaining with 1 : 10,000 aqueous metanil yellow for a few seconds.

The morphology of the rickettsia is variable. They occur as dots, coccobacilli or short rods. Very large numbers are found free in the alveoli, sometimes in clumps as large as the nucleus of an alveolar cell. Rickettsia may be found in almost all alveolar cells of heavily infected lungs and in the cells lining the bronchioles. The polymorphonuclear leucocytes contain only small numbers and the endothelial cells of the blood vessels are rarely involved. Rickettsia are more numerous in lungs infected with murine than with epidemic strains. No evidence of secondary invaders was found, though cultural examinations have not been made.—J. B. BROOKSBY.

See also absts. **1870** (equine encephalomyelitis), **1871** (rickettsia), **1918, 1919, 1920, 1922** (rinderpest), **1917** (bacteriophage).

IMMUNITY

MASUCCI, P. (1946.) **The application of the "lyophile technique" to biologic products. I. Sera, antisera, and antibody globulins.**—*J. Lab. clin. Med.* **31.** 340–345. [Author's summary copied *verbatim*.] **1760**

1. Unprocessed (whole) sera taken as a class are admirably adapted to the "lyophile technique". The dehydrated products show no substantial loss of potency as a result of the desiccation process; the products are restored rapidly and completely and the preservation of potency is maintained under adverse temperature conditions.

2. The removal of water from sera by the "lyophile technique" does not completely arrest or stop all subsequent chemical changes but certainly does retard them. The dry serum forms a system which eventually proceeds to a state of equilibrium which is determined by the temperature, pressure, moisture content, and other energy factors to which the serum is subjected.

3. The maximal residual moisture content in "lyophile" sera was arbitrarily set at 1·0 per cent, a figure now accepted and adopted by the National Institute of Health. This figure seems reasonable and allows a margin of safety for "lyophile" sera kept for long periods of time at a temperature higher than 5°C.

4. The potency of "lyophile" serum is retained for a longer period as compared with the same serum stored in the liquid state. This increased stability is least at from 2° to 5°C., more marked at room temperature and very marked at 37°C.

5. The most advantageous type of "lyophile" serum produced in final containers for use by the clinicians appears to be whole serum. Antibody globulins, unless diluted to a protein content of from 5 to 6 per cent prior to desiccation, are impractical for clinical use because of the excessively long time required to dissolve them.

6. The conversion of liquid sera to the "lyophile" form involves an expense which is reflected in the cost of the product. This added cost is justified for some products but not for others. The lability of the particular product and the temperature to which it is exposed are important determining factors.

TEORELL, T. (1946.) **Quantitative aspects of antigen-antibody reactions. I. A theory and its corollaries. II. Some comparisons between the theory and the experimental results.**—*J. Hyg., Camb.* **44.** 227–236 & 237–242. [Author's summaries copied *verbatim*.] **1761**

I. A quantitative theory has been developed for the reactions between antigens and antibodies, applicable in particular to the precipitin reaction. The theory is equally applicable to unspecific precipitations, for instance the reaction between proteins and protein precipitating agents such as nucleic acids, etc.

The theory is based on the concept that the antigen-antibody interaction is governed by the same principles as the dissociation of a polybasic acid, H_NT, where the antibody corresponds to the hydrogen ion H, and the antigen to the anion T. In their mutual reactions the antigen G is supposed to be polyvalent and the antibody A monovalent: hence the result of the interaction is a mixture of compounds A_NG, $A_{N-1}G$, . . . , AG.

A mathematical deduction is performed starting from the law of mass action, which leads to expressions for the amounts of total precipitate and its constituents in terms of the quantities of antigen and antibody which were mixed and the known equilibria constants.

A numerical example is given for a tetravalent antigen. Three cases are represented in graphical forms: the 'X case' without inhibition zones, the 'Y case' with one and the 'Z case' with two inhibition zones. Certain characteristics are described and the significance of the 'equivalence point' is analysed.

A discussion deals with the irreversibility in relation to the Danysz phenomenon and the dilution effect, and finally the parameters of the theory are more closely considered.

II. The quantitative theory for the interaction between antigen and antibody presented in the previous paper has been compared with some experimental precipitin reactions published in the literature. These reactions include Type VIII pneumococcus polysaccharide-homologous (horse) antibody, egg albumin-(rabbit) anti-egg albumin and diphtheria toxin-(horse) antitoxin.

The general course of the experimental precipitation curves (total amount of precipitate, amounts of precipitated antigen and antibody) corresponded well to the theoretical type curves. Hence it may be concluded that the precipitates may be composed of mixtures of compounds of the types AG, A_2G, A_3G, . . . , A_NG in accordance with the law of mass action. In the cases with 'inhibition zones', however, AG, or A_NG, or both (and perhaps several more compounds) retain the same solubility as the free antigen (G) and free antibody (A).

With regard to the location of the 'equivalence zones', experiment and theory also showed a satisfactory agreement.

A hypothesis on the velocity of flocculation in the precipitin reaction is presented and compared with some recent results. The relation between the immunological concepts 'equivalence (neutral) point', 'optimum point' and 'maximum precipitation point' is also discussed.

EHRICH, W. E., HALBERT, S. P., MERTENS, E., & MUDD, S. (1945.) **Mechanism of the augmenting action of mineral oil on antibody production. Tissue reactions and antibody response to dysentery vaccine in saline, and in saline-lanolin-mineral oil emulsion.**—*J. exp. Med.* **82.** 343–360. **1762**

Rabbits were inoculated into the pads of the hind feet with vaccine either in saline, or in a mixture of 1 part saline, 4 parts mineral oil and 1 part of a proprietary lanolin-like substance. The antibody titre after a single injection of a moderate dose decreased more rapidly in the group receiving vaccine in saline than in that receiving vaccine in oil (1–2 months compared with 6–11 months).

The local changes in the group receiving vaccine in saline were those of acute inflammation, with small abscesses 2–6 days after inoculation; after one month, no granulation tissue could be found and the dead bacteria of the vaccine were not detectable after 24 hours. With vaccine in oil, on the other hand, there was grossly visible abscess formation, with much granulation tissue present after two months and still detectable microscopically after ten months. Bacteria from the vaccine in oil could be demonstrated after 14 days. A characteristic feature of the cellular reaction was the presence of many lymphocytes, macrophages and giant cells.

The changes in the popliteal lymph nodes were essentially the same after the administration of vaccine in saline as after the administration of vaccine in oil, and differed only in the greater intensity of reaction in the group receiving vaccine in oil. Reticulo-endothelial response was regarded as moderate in both groups.

Systemic alterations were observed following even as small a dose as 1·5 mg. of vaccine in saline. A mesenchymal reaction, consisting of lymphocyte and macrophage infiltration and proliferation in and around the small blood vessels, was observed in the lungs; there were also leucocytosis, reticulo-endothelial activity, cloudy swelling and even necrosis in the liver, and reticulo-endothelial activity in the spleen. Such changes did not follow the injection of doses up to 12 mg. of vaccine in oil, with the exception of the slight leucocytosis in the liver. It is concluded that the administration of antigen in oil, as well as prolonging the antibody response, diminishes the toxic effect of the material inoculated.—J. B. BROOKSBY.

ANON. (1944.) **A new serum for a new purpose.**—*Amer. J. publ. Hlth.* **34.** 527–528. [See also POMERAT & ANIGSTEIN—*V. B.* **16.** 191.] **1763**

This short note reports the development by the Russian scientists of "anti-reticular cytotoxic serum". This serum is prepared by injecting horses with cellular material from human spleen and bone marrow. The Russian experiments suggest that this serum stimulates the production of haemolysins and agglutinins, and the process of phagocytosis, in the non-specific sense; that it is of value in the treatment of wounds and frost-bite lowers abnormal blood pressure and, in animals, checks the development of malignant growths.

A new field of research has been opened up, based on evidence that the injection of material from the human body itself can stimulate the reticulo-endothelial system to greater activity and produce increased non-specific resistance to various diseases. This immunity seems to be related to the activity of the connective tissue.

—I. W. BROCKLEHURST.

LOUTIT, J. F., & MCCLEAN, D. (1945.) **The virus-neutralising power of serum from recently vaccinated persons.**—*J. Path. Bact.* **57.** 485–488. **1764**

Tests on the virus-neutralizing activity of serum from recently vaccinated persons indicated that the most potent sera would probably be obtained 3–4 weeks after vaccination but that no considerable fall in potency occurs up to the end of the sixth week. Reference is made to the use of pooled serum from about ten donors for tests of neutralizing potency and to the danger that serum used in such tests might be icterogenic. Precautions for the avoidance of possible reactions due to a high haemagglutinin titre of the serum are described.

*KOOPMANSCH, W. (1942.) Titrage "in vitro" des sérums antioedematiens par la méthode de floculation. [**Titration of *Cl. oedematiens* serum by the flocculation test.**]—*Acta biol. belg.* **2.** 277. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 128.] **1765**

Using toxins of high potency (200 mouse M.L.D. per ml. or 4–5 antigenic I.U.) and, better still, toxoids, K. found it possible to standardize *Clostridium oedematiens* antisera by the flocculation method. The results were comparable to those obtained by titration *in vivo*.

—M. L. LEVI.

*GOLEM, S. B. (1943.) Recherches sur le cours des antitoxines tétaniques chez une vache hyperimmunisée, dans son lait et son veau après le velage. [**Development of tetanus antitoxin in a hyperimmunized cow, and in its milk and offspring.**]—*Türk. Z. Hyg. exp. Biol.* **3.** 102. [In French.] [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 8. 34, copied *verbatim*.] **1766**

In spite of continual inoculations and bleedings, a cow hyperimmunized against tetanus bore a healthy normal ♀ calf. The cow's milk 10 days after calving contained >30 and <50 international units but the titer diminished rapidly to 3–6 units and stayed at this level until the calf was weaned. The antitoxin titer of the milk did not ever reach the level of that in the blood of the cow. The antitoxin titer of the calf's blood at birth was higher than that of the cow, indicating an accumulation of the cow's antitoxin in the fetus. [The abstract does not state whether the titre was measured before or after the calf had drunk the dam's colostrum.] After 8 wks. the calf's serum contained 600 units of tetanus antitoxin.

MUKERJEE, S. (1944.) **The stability and absorption of the antigens of *Bact. typhosum* with special reference to oral immunization. Part II.**—*Ann. Biochem. exp. Med.* **4.** 57–66. [Abst. in *Bull. Hyg., Lond.* **20.** 430, slightly amended. Signed: J. C. CRUICKSHANK.] **1767**

Continuing his enquiries into the possible efficacy

of typhoid vaccines administered orally the author studied the production of agglutinins in rabbits and a small number of monkeys which had received vaccines by the alimentary route. The vaccines were of various types, including heat-killed and formolized saline suspensions and alcoholized Vi suspensions. They were given by catheter into the stomach, directly into the small and large intestine by injection after laparotomy, and *per rectum*.

H antigen was destroyed in the stomach but not in the small or large intestine. In all parts of the intestinal tract O and Vi antigens, though slowly destroyed, survived sufficiently to produce O and Vi antibodies in most of the animals, but the titres obtained were low in comparison with those produced by parenteral injection. The author considers that humoral immunity might be fortified by local immunity in persons receiving vaccine by the mouth. No advantage was noted in a few experiments in which bile was included in the vaccine. It is suggested the Vi-containing typhoid vaccine may be given by the oral route in liquid form almost as effectively as in capsules or enterosol-coated tablets.

SHEPARD, C. C. (1946.) **The release of antigen from certain bacteria on treatment with ether.**—*Publ. Hlth Rep., Wash.* **61.** 54–59. [Author's summary copied *verbatim*. **1768**

Ether treatment of certain bacteria resulted in the release of soluble antigen as demonstrated in a precipitin test with rabbit serum prepared against untreated organisms. The most abundant precipitates were seen with several strains of *Proteus*, with the three strains of *Brucella*, and with *Pasteurella tularensis*. Less abundant precipitates were seen with several other gram-negative bacilli. Little or no evidence of such soluble antigen was seen with several gram-positive organisms, although only a few strains were tested.

*MACLOUF, A. C. (1942.) Sur la conservation de la tuberculine diluée. **[Conservation of diluted tuberculin.]**—*Rev. Path. comp.* **42.** 328–333. [Abst. from abst. in *Bull. Inst. Pasteur*. **42.** 75.] **1769**

Tuberculin (mode of preparation not given in abstract), diluted 1 : 1,000 or over with distilled water or saline and preserved in sealed phials, remained potent over a long period, in some cases up to nine years. M. believes that the loss of potency of tuberculin on dilution is not such that one should systematically discard diluted products a few days after preparation.
—M. L. LEVI.

AUGUSTINE, D. L., & LHERISSON, C. (1946.) **Studies on the specificity of intradermal tests in the diagnosis of filariasis.**—*Amer. J. Hyg.* **43.** 38–40. [Authors' comments and conclusions copied *verbatim*.] **1770**

While it has not been possible for us to perform experiments which would yield direct evidence on the question of infective larvae of nonhuman filarial worms producing filarial sensitization in man, our results clearly show that extracts of these parasites are markedly antigenic when injected into mammalian skin, and that the resulting immune response is demonstrable by skin tests employing either specific or nonspecific filarial antigens.

We are, therefore, justified in supposing (a) that nonhuman filarial worms can influence the serological reactions of man, and (b) that many of the hitherto unexplained false positive skin reactions following the use of *Dirofilaria immitis* antigen are due to immune responses produced by filariid larvae of animals. The matter should receive thorough field investigation.

COOMBS, R. R. A., MOURANT, A. E., & RACE, R. R. (1946.) **In-vivo isosensitization of red cells in babies with haemolytic disease.**—*Lancet*. **250.** 264–266. [Authors' summary copied *verbatim*.] **1771**

A test is described for the detection of the in-vivo sensitisation, by maternal Rh antibody, of the red-blood cells of infants with haemolytic disease. These sensitised cells are agglutinated by an antihuman-globulin serum, whereas the cells of normal infants are not agglutinated. An antigen and its homologous antibody, of a type previously unknown, have been disclosed by this technique.

*HOOKER, S. B. (1944.) **Qualitative differences among canine danders.**—*Ann. Allergy*. **2.** 281–283. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 8. 36, slightly amended. Signed : HORACE GOLDIE.] **1772**

The author's interest in the possibility of differentiating breeds of dogs by the techniques of allergy was aroused six years ago when he saw a patient who had a severe attack of asthma two days after he had acquired a French poodle. For several years immediately preceding, he had had an English bulldog as a close companion, and there had been no indication of allergic trouble from this source. The poodle was removed to a friend's house and the patient's house was cleaned. The patient returned from the hospital, where the attack had promptly subsided and had no more asthma except for a mild attack shortly after his friends, minus the poodle, visited him. If we assume the presence of a single atopic excitant common to the danders of different canine breeds, and if we so adjust the concentrations of two extracts that they elicit equal responses in a sensitive patient, then we must expect all other test-subjects to give reactions that are parallel, *i.e.*, strongly positive, weakly positive, or negative. The author's failure to observe this parity of response indicates the presence of multiple or at least dual excitants in some extracts. It is the general impression that short-haired dogs cause less respiratory allergy than long-haired ones. Many patients voluntarily or upon inquiry state that their clinical sensitivities are not the same to different breeds of long-haired dogs.

ROGERS, H. J. (1945.) **The conditions controlling the production of hyaluronidase by micro-organisms grown in simplified media.**—*Biochem. J.* **39.** 435–443. **1773**

Certain strains of streptococci and staphylococci, *Clostridium welchii* Type A, and *Cl. septicum* will all produce hyaluronidase (the enzyme which hydrolyses hyaluronic acid) when grown on synthetic media, which must be buffered. The production by streptococci and *Cl. welchii* is increased by the addition of hyaluronate to the media ; this adaptive response is also brought about by the products of hydrolysis of hyaluronic acid by testicular hyaluronidase but not by the more degraded products which are produced by streptococcal hyaluronidase. *Cl. septicum* and staphylococci require different factors (present in peptone) for the production of hyaluronidase.—E. BOYLAND.

See also absts. **1698** (rapid tuberculin test), **1699, 1700** (BCG vaccination), **1701** (Koch's phenomenon), **1709, 1710** (brucella vaccines), **1711** (standardization of brucella agglin. test), **1735** (immunization against foot and mouth disease), **1736** (conglutination test in F. & M. disease), **1737** (rabies vaccination), **1738** (sheep pox vaccination), **1739** (swine influenza antigens), **1747, 1748** (virus immunization), **1750** (rinderpest vaccine), **1751** (swine fever immunization), **1758** (precipitation test in infective hepatitis), **1793** (tumour antibodies).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

U.S.A. (1943.) **Report of the Chief of the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, 1943.** [ANNAND, P. N.] pp. 58. Items of veterinary interest pp. 22–23, 25–27 & 51. Washington, D.C.: U.S. Govt. Printing Off. 8vo. **1774**

The greater part of this report is concerned with the insect pests of man and crops, the only section of direct veterinary interest being that dealing with insect pests of animals. An aqueous spray containing 1·5% sodium fluoride and 0·5% nicotine sulphate is effective against ticks when applied to camp sites weekly at the rate of 170 gal. per acre. D.D.T. applied as a spray to the necks and backs of cattle killed *Lyperosia* for 3–4 days afterwards and kept the population of flies to a low point for about two weeks after treatment. Attempts have been made to find a substitute for rotenone for the treatment of cattle lice and of 25 compounds tested, nicotine sulphate and lethane 60 were fairly satisfactory when used alone and very efficacious when used together. Investigations on aerosols used in the control of flies and mosquitoes has shown that an increase in the concentration of non-volatile material up to 16% increases toxicity and a capillary tube with a 0·017 in. bore disperses the aerosol solution better than the oil burner nozzle previously used. An aerosol containing 0·6% pyrethrum and 8% sesame oil in dichlorodifluoromethane was found to be as toxic to flies as a solution containing 1% of pyrethrum and 2% sesame oil. A number of synthetic and plant products were tested as substitutes for pyrethrum, the most effective synthetic products being D.D.T. and its bromine analogue, and the best plant products, extracts of *Willardia mexicana, Ryania speciosa* and *Amorpha fruticosa*. A mixture containing pyrethrum, 2,4-dinitroanisole, a stabilizer, and isobutylundecyleneamide proved acceptable to the army for the control of body lice. The properties of D.D.T. have been studied and this work is continuing. Investigation failed to confirm the presence of rotenone in the plants *Amorpha fruticosa* and *Pachyrhizus erosus*. The "dog" fly [*Stomoxys*] has been controlled by spraying the breeding places; the composition of the spray used is not stated.—T. E. G.

CRAGG, J. B., & RAMAGE, G. R. (1945.) **Chemotropic studies on the blow-flies *Lucilia sericata* (Mg.) and *Lucilia caesar* (L.).**—*Parasitology*. **36**. 168–175. **1775**

The authors were able to induce oviposition by *L. sericata* on a moist clipped fleece by treating it with a mixture of ammonium carbonate and indole, and from this they conclude that attraction is not completely dependent on some factor produced by the living sheep.

The results of trials with various chemical baits support the hypothesis that attraction is the result of the breakdown of cystine, with the production of sulphur compounds, coupled with the presence of ammonium carbonate or of some putrefactive material. —W. MOORE.

PARMAN, D. C., LINDQUIST, A. W., BARRETT, W. L., Jr., PARISH, H. E., BRODY, A. L., ROGERS, E. E., & DEONIER, C. C. (1945.) **[Overwintering ecology of the screwworm—a symposium.]**—*J. econ. Ent.* **38**. 66–95. **1776**

Estimation of the population of *Cochliomyia americana* from the numbers captured in successive years in meat-baited traps over a large area of the southern states of the U.S.A. revealed large fluctuations. The number taken in traps appears to be closely correlated with the probable degree of infestation of livestock in an area. Climatic factors and their fluctuations can be correlated with fluctuations in trap catches and with the existence or absence of an overwintering population. Normal overwintering of the fly as larvae or adults is confined to the extreme southern parts of the U.S.A. where the mean daily temperature never falls below 49°F.; the species has no true hibernating stage. The limits of moisture toleration [presumably of the larvae in the soil] are 0·4–5·0 in. rainfall per month. Wind also affects the size of the fly population, which is thus higher in brush-covered areas. Pupae suffer least mortality in the soil in fairly dry weather with much sun.

Adult life normally lasts about two weeks, but the adults may be killed during cold nights following warm days. Major fluctuations in climate, especially in temperature, may sometimes prohibit overwintering in an area where it usually occurs. Areas where the fly is unable to survive the winter are reinfested by migration from overwintering areas.

Livestock management practices greatly affect the population level of the screwworm fly, and PARMAN recommends measures tending towards reduction in the incidence of man-made wounds on livestock. The shearing of sheep at an earlier and less extended period in the autumn will reduce the incidence of screwworm infestation, and thus apparently reduces the overwintering population of the fly. The presence of wounded livestock in combination with high mean temperatures in the midwinter period, is necessary for overwintering. Caverns and animal burrows were not found to be used as shelters by overwintering flies. A higher percentage of emergence, however, was obtained from larvae planted in manure, and development was more rapid than in soil.—L. DAVIES.

PETERSEN, G. (1945.) Oksebremselarvens Forekomst i Danmark i Aarene 1935–1944. **[Incidence of ox warbles in Denmark in 1935-44.]**—*Maanedsskr. Dyrlaeger*. **57**. 1–14. **1777**

P. reports ten years of progressive reduction in the incidence of ox warbles, based on statistics from inspections of cattle and of hides in infested areas. Cattle inspections were not made in 1939 and 1940, and there was an increase, possibly due in part to climate, reported in 1941, which has since been rapidly reduced. Damaged hides were 4·5% in 1941, as against 2% in 1938. South Jutland was most strongly infested and the islands, especially Bornholm, were free from infestation, as were certain east coast areas. A reduction was observed before derris treatment was generally introduced in 1935, and since derris preparations were unavailable during the latter war years, it must be concluded that mechanical methods carried out by the farmers have been effective.—M. EKENBERG.

GREGSON, J. D., & HOLLAND, G. P. (1944.) **Devices for charting and obtaining naturally emerged cattle warbles (Diptera: Oestridae).**—*Proc. ent. Soc. B.C.* **41**. 31–33. **1778**

A description is given of two useful devices for warble-fly studies. The first records the position of warbles on the back of the affected beast and consists of pieces of thin wood five feet long with a cross bar two feet long fastened one foot from the end. Each piece of wood is marked off at 2 in. intervals. In use the long stick is placed along the animal's vertebral column and the short one level with the tuber coxae; the position of any warble can then be recorded by reference to the marks on each bar.

The second device is designed for the collection of emerging warble larvae and consists of two pieces of canvas 24 in. long tied over the back and under the belly so as to fit closely to the animal's side. The

bottom edges are turned up 3 in. on each of the insides to form pouches into which the larvae fall. Diagrams in the text illustrate the construction and use of both devices.—T. E. GIBSON.

BELSCHNER, & NICHOLSON, A. J. (1944.) **Problems of buffalo fly infestation.**—*Aust. vet. J.* **20.** 314–316. **1779**

In addresses to the New South Wales Division of the Australian Veterinary Association, the authors discussed the buffalo fly, *Lyperosia exigua*. B. dealt with its introduction into and spread in northern Australia, with its pathogenic and economic effects and with the present attempts to prevent its further spread southwards. N. dealt with its life-cycle and habits, trapping and the use of D.D.T. sprays for controlling the fly in dairy herds.—H. McL. GORDON.

I. TANGANYIKA. (1944.) **Report on the work of the Tanganyika Tsetse Research Department since February, 1944.** pp. 2+12. fcp. Typescript. **1780**

II. TANGANYIKA. (Undated.) **Additions to the report of the work of the Tanganyika Tsetse Research Department since February, 1944 in order to bring it up to January, 1945.** pp. 2. fcp. [Typescript.] **1781**

I & II. Experimental work continued on the fat synthesis and feeding of tsetse flies, an apparatus having been devised which should enable one operator to feed 500 flies an hour [details not given].

The use of alcoholic extract of ox scent on trap screens gave good results with *G. pallidipes*, and to a lesser extent with *G. swynnertoni*. It was found that the age of tsetse flies can be judged approximately by the fraying of the wings; apparently the majority of flies caught are too young to have infective trypanosomes. Work on hybridization between species is recorded: two races of *G. morsitans* were encountered, which when interbred produced sterile male hybrids, and partially sterile females. The introduction of *G. morsitans* pupae into a *G. swynnertoni* area appeared to decrease the population of the latter fly; the proportion of hybrids amongst the *G. swynnertoni* is increasing. Fire exclusion and clearing of drainage lines appear to be giving satisfactory results in one *G. morsitans* area, and fire exclusion and clearing of hardpans appear to have reduced by two-thirds the *G. swynnertoni* population in another area. Other field experiments planned have largely been abandoned owing to shortage of staff.

Measurements of *T. congolense* are said to have shown it to be dimorphic, and measurements of *T. rhodesiense* in relation to its electric charge to have shown it to be tetramorphic. It is also stated that a study of the chromosomes of trypanosomes revealed two sexes in all species examined, that mitosis, meiosis and chromosomes were observed in *T. rhodesiense*, *T. brucei*, *T. congolense*, *T. simiae* and *T. vivax*, that flagellated gametes were observed in *T. rhodesiense*, *T. congolense* and *T. vivax* and that gametes were seen to unite with the reduced nucleus of *T. vivax* from the labrum of *G. swynnertoni*. [No account is given of the method used for these observations.] A definite seasonal variation was observed in the trypanosome infection rate of tsetse, this variation also occurring in game. It has also been noted that the fly infection rate has decreased steadily during the last three years.

—U. F. RICHARDSON.

OMER-COOPER, J., & WHITNALL, A. B. M. (1945.) **An arsenic-resistant tick.** [Correspondence.]—*Nature, Lond.* **156.** 450–451. **1782**

The authors describe a laboratory experiment showing the existence of an arsenic-resistant race of the "blue" tick (*Boophilus decoloratus*) in South Africa. Of fully engorged females from an area populated by presumed "resistant" ticks, 63% laid large batches of eggs after treatment with 0·64% As_2O_3 and one-third of these eggs hatched. Similar females from a "non-resistant" area were virtually prevented from egg-laying by treatment with 0·32% As_2O_3, while 0·16% As_2O_3 was sufficient to render all the eggs laid non-viable. The arsenic-resistant tick appears to have spread north and south along the coast from East London where it was first observed in 1938.—L. D.

EDDY, G. W., & JOYCE, C. R. (1944.) **The seasonal history and hosts of the American dog tick, Dermacentor variabilis, in Iowa.**—*Iowa St. Coll. J. Sci.* **18.** 313–324. **1783**

Dermacentor variabilis was incriminated as a vector of Rocky Mountain spotted fever in 1911, and since that date it has been shown to transmit tularaemia and bovine anaplasmosis. To supplement the considerable knowledge already available about this tick, studies of available hosts and incidence were made on an Indian Reservation during 1941. 11,442 adult ticks were counted on 1,132 dogs, with a peak infestation of 89 ticks per dog during May. Particulars of hosts for immature stages had hitherto been scanty, but the authors examined large numbers of dogs, cats, mice, fox squirrels, rabbits, birds and other animals which harbour larval and nymphal stages. Predilection sites of attachment were also recorded.—G. B. S. HEATH.

PAVLOVSKIĬ, E. N., & SKRYNNIK, A. N. (1945.) O prodolzhitel'nosti sokhraneniya samkoĭ kleshcha Ornithodorus papillipes sposobnosti peredavat, kleshchevoĭ vozvratnyĭ tif. [**On the period during which females of *Ornithodorus papillipes* are able to transmit tick relapsing fever.**]—*Zool. Zh.* **24.** 161–164. [English summary.] [Abst. in *Rev. appl. Ent.* Ser. B. **33.** 165, copied *verbatim*.] **1784**

Of a batch of 24 nymphs and adults of *Ornithodoros tholozani*, Lab. & Mégn. (*papillipes*, Bir.) taken in October 1931 in a cave near Stalinabad (western Tadzhikistan) and brought to Leningrad, 14 were alive in February 1933, ten in May 1934, six in April 1935, three (all females) in October 1940, and two in January 1941. During these years the ticks were allowed to feed at intervals on laboratory animals, and they transmitted spirochaetes of relapsing fever, with which they were naturally infected, to guineapigs and *Dyromys nitedula*. In September 1941, the two surviving females were sent in a thermos flask to Samarkand, where they arrived in October 1942. They had not fed for about two years, and one of them was dead in the following month. The other was taken back to Leningrad in June 1944, together with an adult male that had been found in western Kirghizia in 1935, and both were allowed to feed on a guineapig in October 1944. The latter subsequently showed spirochaetes in its blood, and as the male had failed to infect laboratory animals on any of the occasions on which it had fed alone, it is concluded that they were transmitted by the female.

Previous investigations by the authors have shown that *O. tholozani* can live for up to 25 years and can resist starvation for up to 7½ years. Its long life, the fact that spirochaetes persist in it from generation to generation, its wide range of hosts, other than man and domestic animals, and its tendency to move about little ensure the preservation in nature of foci of relapsing fever.

GUILHON, J., & FORESTIER, E. (1945.) Une nouvelle et grave épizootie de gale bovine. [**A new and serious epizootic of sarcoptic mange in cattle.**]—*Bull. Acad. vét. Fr.* **18.** 154–160. **1785**

A description is given of a severe outbreak of

sarcoptic mange in cattle. Three cases of the disease had been observed in January 1942, but by the application of energetic control measures these cases were cured and the disease did not spread further. In August 1942 further cases arose 20 km. from the first outbreak. The owner of the newly affected cattle refused to apply control measures and the disease became widespread, affecting animals in 12 herds during the period 1942 to January 1945. In some herds there were a number of deaths, particularly in calves, and infection was spread to three human beings and to two horses. A detailed description with photographs is given of the course of the disease in the affected animals. The most effective treatment was with sodium hyposulphite and hydrochloric acid.

Owing to the severe losses which may result from the rapid and widespread dissemination of this disease when control measures are not quickly applied, the authors suggest that mange in bovines should be made a scheduled disease.—T. E. GIBSON.

See also absts. **1706** (vectors of tularaemia), **1909** (fly " strike " in sheep), **1918** (*Glossina*), **1745, 1746** (*Ixodes*), **1872-1875, 1917** (insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

OLSEN, O. W., & FENSTERMACHER, R. (1943.) **The helminths of North American deer, with special reference to those of the white-tailed deer (*Odocoileus virginianus norealis*) in Minnesota.**—*Tech. Bull. Minn. agric. Exp. Sta.* No. 159. pp. 20. **1786**

P.M. examination of 74 deer and 21 portions of deer carcasses originating from various parts of Minnesota revealed four species of arthropod and six of helminth parasites.

With one exception, no helminths were found in yearlings, but these generally harboured ecto-parasites, especially lice. The most common helminths found were *Fascioloides magna* and *Cysticercus tenuicollis*. A fairly comprehensive key is appended for identification of adult helminths, eggs, and larvae occurring in North American deer.—G. B. S. HEATH.

TARASOV, V. R. (1940.) Operativnoe lechenie tsenuroza ovets. **[Surgical treatment of coenurosis in sheep.]** —*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939* [*Collected Works*]. pp. 223–235. **1787**

T. describes the location of a coenurus in sheep by observing the impairment of co-ordination of movement and of vision, examination of the fundus oculi, the tonus of the sympathetic nervous system, hypersensitivity to touch, variation in skull thickness and the physico-chemical properties of the cerebro-spinal fluid. The clinical symptoms associated with cysts in different regions of the brain are described in detail.

After discussing the topography of the sheep's brain, T. describes and illustrates a new surgical technique for the treatment of coenurosis by aspiration of the cyst fluid. The operation was found to be successful in 95% of cases.—L. LEVENBOOK.

WHITTEN, L. K., & LUKEY, E. J. (1944.) *Coenurus cerebralis* **in New Zealand sheep. With a note on the occurrence of a tri-radiate scolex in this parasite.** —*Aust. vet. J.* **20.** 305–306. **1788**

An outbreak was investigated in which 40 out of 140 yearling ewes died with symptoms suggestive of either coenurosis or cerebral echinococcosis. P.M. examination showed *C. cerebralis* to be the cause.

—H. McL. GORDON.

SCHNELLE, G. B., & JONES, T. C. (1945.) **Dirofilaria Immitis in the eye and in an interdigital cyst.**—*J. Amer. vet. med. Ass.* **107.** 14–15. **1789**

Case histories are given of two dogs infected with *D. immitis*. In one case, the only parasite found was removed surgically from the anterior chamber of the eye. In the other case, a parasite was discovered in an interdigital cyst; the peripheral circulation in this case showed many microfilariae and at autopsy a large mass of worms was found in the pulmonary vein.

—G. B. S. HEATH.

See also absts. **1796** (poultry parasites in Wartheland), **1900** (trichinosis), **1917** (*Haemonchus*), **1770** (intradermal tests for filariasis), **1876** (phenothiazine).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

HOPPER, H. D. (1945.) **Some dog neoplasms.**—*Cornell Vet.* **35.** 137–147. **1790**

Brief notes are given of the clinical picture and pathology of several cases, involving tumours of the anal glands, carcinomata of the lungs, thyroid and liver, a sarcoma of the chest wall and a melanoma of the eye.

—J. B. BROOKSBY.

WILLIS, R. A. (1945.) **An outline of recent advances in the experimental production of tumours.**—*Med. J. Aust.* April 14th. 361–368. **1791**

This review article includes discussion of occupational skin cancers, attempts to produce tumours experimentally in animals by the agents probably responsible, carcinogens in tars and oils, the experimental production of mammary tumours and the relationship of oestrin and duct stasis to breast cancer.

—N. WICKHAM.

KALLÓS, P., & KALLÓS-DEFFNER, L. (1943.) Karzinomstudien. V. Über die Empfänglichkeit männlicher und weiblicher Kaninchen für das Impfkarzinom von Brown und Pearce und über die Lokalisation der Karzinommetastasen bei beiden Geschlechtern. VI. Über die Empfänglichkeit kastrierter männlicher und weiblicher Kaninchen für das Impfkarzinom von Brown und Pearce und über die Lokalisation der Karzinommetastasen bei diesen. **[Carcinoma studies. V. Susceptibility of male and female rabbits to the Brown-Pearce carcinoma, and localization of metastases in the two sexes. VI. Susceptibility of castrated and spayed rabbits to the Brown-Pearce carcinoma and localization of metastases in such animals.]**—*Schweiz. Z. allg. Path. Bakt.* **6.** 180–191 & 212–221. [Absts. in *Biol. Abstr.* Sect. F. **19.** No. 7. 15, copied *verbatim*. Signed: H. SIMONS.] **1792**

V. Rabbits were inoculated with Brown-Pearce's carcinoma. Positive takes in ♂ were 82±3·71 %, in ♀ 45±4·6 %. The spleen showed a remarkable tumour resistance. The localization of the tumours presented a different picture in both sexes, a difference which proved to be statistically significant. In ♂ extensive carcinomatous lesions in the lungs and liver occurred constantly. The testicles remained free without exception. In ♀ the lungs and liver were rarely invaded. The main site of the tumours was the urogenital system, especially the ovaries, uterus, and mam-

mary glands. Apart from these localizations, tumours were found frequently among ♀ in the thyroid gland, thymus gland, salivary gland, skin and skeletal muscles. Some organs, chiefly the kidneys, were invaded with the same regularity in both sexes.

VI. Intravenous inoculation of Brown-Pearce's carcinoma cells into previously castrated ♀ rabbits is followed by a type of localization of the resulting tumours which is entirely different from the localization in ♂ rabbits. Castration of ♂ rabbits has no influence on tumour localization. The spleen manifests pronounced tumour resistance also in castrated animals.

FRIEDEWALD, W. F., & KIDD, J. G. (1945.) **Induced antibodies that react *in vitro* with sedimentable constituents of normal and neoplastic tissue cells. Presence of the antibodies in the blood of rabbits carrying various transplanted cancers.**—*J. exp. Med.* **82.** 21–39. **1793**

The authors previously (1938) described a distinctive substance reacting with specific antibody which can be extracted from the Brown-Pearce rabbit carcinoma; this paper is concerned with antibodies which have similar properties and which appear in the blood of rabbits carrying transplanted cancers of different kinds.

Four transplantable rabbit cancers were used, two carcinomas and two sarcomas, sieved tumour tissue being implanted into 6–8 different sites on young domestic rabbits. By means of a complement-fixation test, in which saline extracts of normal and neoplastic tissues were used as antigens, it was found that antibodies were present in the blood of certain rabbits carrying one or other of the four transplanted cancers. These induced tissue antibodies were found to be similar to natural tissue antibodies in some respects, but to differ from them inasmuch as they were not present in the blood of normal rabbits and withstood heating at 65°C. for 30 min. No induced tissue antibodies could be found in the blood of rabbits carrying papillomas or cancers composed of the animal's own cells, nor in the blood of rabbits showing regressed vaccinia or fibroma virus lesions.—J. C. BUXTON.

TWOMBLY, G. H., & MEISEL, D. (1946.) **The growth of mammalian tumors in fertile eggs. Is a filterable cancer virus produced?**—*Cancer Res.* **6.** 82–91. [Authors' summary copied *verbatim*.] **1794**

Rat sarcoma R39, Bagg mouse carcinoma 755, and the RC mouse carcinoma of Taylor have been grown successfully in fertile incubated hen's eggs. The mortality of such eggs has been very high, 73 per cent by the 17th day of incubation, making this method a poor one for the routine growth of tumor tissue.

The yolk from eggs bearing the rat sarcoma R39 did not produce sarcomas when injected into susceptible rats save in one instance, where the centrifuged sediment of such yolk did not confer immunity on young rats so treated. Yolk from eggs bearing either of the two mouse mammary carcinomas frequently reproduced the tumor when injected into susceptible mice. Repeated attempts to filter the tumor agent through Berkefeld "N" or "V" candles were unsuccessful. Freezing and thawing of yolk or lyophilization destroyed tumor-producing activity, as did heating at 48° to 50°C. for 30 minutes. The tumor-producing agent was equally effective in male, or female mice.

If yolk from tumor-bearing eggs was diluted 1 : 1 with saline and centrifuged at low speed (2,600 r.p.m.) for 5 minutes tumor activity could be demonstrated almost universally in the fatty cream found above the centrifuged yolk and in the bloody sediment at the bottom, but not in the watery yolk between. The tumor-producing layers contained cells easily demonstrable under the microscope.

Tumor-producing activity was not closely correlated with red blood cell content nor could it be released by hemolysis from sediments containing red cells. Most of the tumor-producing activity could be removed by simple filtration through filter paper. Tumor-producing activity of the fatty layer was destroyed by extraction with ether.

In our opinion, the tumor-producing capacity of egg yolk from yolk sacs in which mammalian tumors have been grown is due to the presence in it of viable tumor cells. No convincing evidence of the presence of a virus or filterable agent has been encountered in our experiments.

*HOECKER, S. G. (1944.) Estudios sobre leucosis en las aves y cuadro hemático normal de la gallina. **[Leucosis of birds and the normal blood picture of the fowl.]**—*Biologica, Santiago.* **1.** 27–94. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 57, slightly amended. Signed: GINA CASTELNUOVO.] **1795**

Attempts to transmit Chilean strains of fowl leucaemia experimentally failed, but experiments with the N. American "A" strain were successful. 11 passages were performed within a year and 391 chickens of different age and race were inoculated. Of these, 110 showed myeloid leucaemia with alteration of the blood, and 11 cases were suspicious. Myeloid leucaemia is characterized by an extraordinary increase of leucocytes, especially myeloblasts, and by anaemia and thrombocytopenia in different degrees. Bone marrow becomes hyperplastic and leucocytes are numerous in the blood vessels and infiltrated in different parenchymas. A careful study of the normal blood and of the haemopoietic organs is also reported.

DISEASES, GENERAL

KAUKER, E. (1943.) Geflügelkrankheiten im Warthegau. **[Poultry diseases in Wartheland.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 64–66. **1796**

A survey of poultry diseases was made in Wartheland over a period of two years and four months, the material examined consisting of 961 hens, 176 geese, 190 ducks, 65 turkeys, ten pheasants and eight pigeons.

TB. was widespread, being diagnosed in 9·7% of all hens examined. In one flock the disease occurred in young Rhode Island Reds while birds kept under identical conditions and of the same age, but of different breeds, remained free; transmission through the egg may be indicated. Pseudotuberculosis appeared in turkeys and a few hens on two farms, in each case in the months of February and March. *Salmonella pullorum* infection was diagnosed in 21·7% of cases in chicks and pullets, and is increasing considerably. *Salmonella dublin* was demonstrated in two hens, *Salmonella typhi-murium* in geese, ducks, hens and one pigeon. Aspergillosis was common in hens, turkeys and young geese, in which it was associated with stomach worm infection. Fowl cholera was diagnosed in 31·3% of cases examined. Seventeen flocks were affected with fowl plague, which had apparently been brought in from Silesia at the end of 1942 by a consignment of pheasants. Other infectious diseases observed included contagious coryza, fowl diphtheria, fowl pox, fowl paralysis, blackhead and botulism.

Of parasitic diseases noted coccidiosis was found

to have increased considerably since 1940, being diagnosed in 19·4% of birds examined. Gapeworm disease occurred every year in June and July and caused 6% of deaths in chicks. *Capillaria* and *Ascaridia* were common and *Prosthogonimus pellucidis* caused deaths in hens and heavy losses in egg production on 15 farms where the birds lived near water. Stomach worm disease occurred in 55% of goslings sent in. No losses took place in flocks where carbon tetrachloride was used. Enzootics in water birds, especially in ducklings, were caused by *Acuaria uncinata* and *Tetrameres fissispina*.

Faulty management and feeding and non-specific diseases led to many deaths. Phosphorus and arsenic poisoning occurred and on one farm two birds died from naphthalene poisoning after eating mothballs. Ducks died with nervous symptoms in one flock, and stopped laying in another after eating the caterpillars of the cabbage white butterfly.—ANN F. RUSSELL.

—. (1945.) **The National Turkey Improvement Plan.**—*Misc. Publ. U.S. Dep. Agric.* No. 555. pp. 25. **1797**

The U.S.A. National Turkey Improvement Plan became operative on September 25th, 1943, with the approval of the U.S. Secretary of Agriculture and "under authority of an appropriation made by Congress for the Bureau of Animal Industry, to be used in co-operation with State authorities in the administration of regulations for the improvement of poultry, poultry products, and hatcheries". Acceptance of the plan by States and individual members of the industry within them is optional. The original plan, which was developed by a committee appointed by the Turkey Federation and unanimously adopted by the general session of the Federation, aimed primarily at improving the production and market quality of turkeys and at reducing losses from disease. Through it, turkey breeding stock, hatching eggs, and poults could be given official recognition as to breeding quality and degree of freedom from pullorum diseases. This publication describes the plan in three main articles dealing with general regulations, breeding stages and pullorum classes, and gives an appendix on the methods of carrying out the official test for pullorum disease.

Matters relating to disease are under the direction of the livestock sanitary authorities, or officials of the state colleges of agriculture or similarly authorized state agencies, in co-operation with the Bureau of Animal Industry. The official state agency assumes responsibility for the accuracy of the pullorum testing, the official test being the standard tube agglutination test. The rapid serum test was allowed for one year from August 1st, 1944, on condition that the state agency using this method agreed to test 500 or more turkeys with both the rapid and the standard tube method and made pathological examinations of all turkeys reacting to either test, reporting the results to the Bureau of Animal Industry. In testing for pullorum disease, all blood samples must be drawn by an authorized blood collector and tested in a laboratory recognized and approved by the official state agency. Blood collectors have to be trained in the collecting of samples and must pass an examination in the turkey plan provisions.

There are four pullorum classes, including U.S. pullorum-tested and U.S. pullorum-controlled, both of which tolerate a certain number of reactors; after the 1947–48 season, however, these classes will be deleted from the plan; the U.S. pullorum-passed category permits no reactors but embodies the recognition of infected premises, whilst U.S. pullorum-clean flocks must have had no reactor in the breeding stock within the six months immediately preceding the date of the first sale of hatching eggs, poults, or breeding stock, and all other poultry must be similarly tested and found to be clean, or must be completely segregated from the turkeys.

The plan contains no other specific rules on disease control or prevention, but the application of the pullorum eradication proposals, combined with the rigid selection of breeding stock necessary to attain one or other of the four breeding stages, is expected to achieve an improvement in the general health of turkey flocks.

—J. D. BLAXLAND.

MANN, T. B. (1945.) **Chick rearing. I. The effect of diet on mortality with special reference to six-day disease. II. The bacterial syndrome arising from a diet which is conducive to six-day disease. III. The effect of diet on vitamin A, xanthophyll and carotene metabolism. IV. The mechanism of infection in six-day disease with special reference to intestinal putrefaction.**—*J. agric. Sci.* **35.** 95–97, 98–100, 101–107 & 108–115. **1798**

I. M. describes three tests in which he fed certain rations to chicks in order to reproduce "six-day disease". When a good ration of high starch content was fed, no mortality resulted. On the other hand, rations of high protein or low starch content, fed under similar conditions to the control group, resulted in 28 and 43% of deaths from "six-day disease".

M. states that trichlorethylene-extracted palm kernel is not the essential factor in the production of "six-day disease" and that certain diets tend to establish this disease.

II. M. considers that the ordinary routine methods of bacterial culture are useless in the diagnosis of poultry diseases, but records good results from broth to which was added palm kernel meal as a nidus. The author's conclusion was that "six-day disease" is due to a blood and tissue invasion by heterogeneous microbes, with *Clostridium welchii* predominating.

III. Evidence from feeding experiments is presented that vitamin A metabolism is adversely affected when a meat meal, having a vitamin A consuming power *in vitro*, is included in the diet of chicks. A fish meal without a vitamin A consuming power did not increase the mortality rate in tested chickens. Fish meal, whether destructive of vitamin A or not, depresses pigment deposition in the legs of chicks up to 28 days. An appendix describes the methods of analysis used in these experiments.

IV. Experiments indicate that diets conducive to intestinal putrefaction produce a high mortality, anaemia and other secondary complaints. M. states that "six-day disease" in chicks is a disease of intestinal putrefaction and may be fostered by a ration which contains animal proteins with evidence of putrefaction, an excess of fibre, *e.g.*, palm kernel meal, which assists in the proliferation of putrefactive bacteria, or insufficient carbohydrates to maintain an acid reaction in the lower end of the intestine.—W. R. KERR.

*IMBASCIATI, B. (1943.) L'importanza della correlazioni androzoonotiche aviarie nell'etiopatogenesi delle infezioni umane. **[Birds as carriers of infection to human beings.]**—*Riv. Parassit.* **5.** 235. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* July 21st. 240. (1944).] **1799**

Proceeding from the parasitological examination of the blood, liver and faeces of 325 migratory birds, the author discusses the infectious diseases which can be conveyed to human beings and domestic animals by birds. Psittacosis of the fulmar petrel in the Faroes, erysipelas, avian TB. and tularaemia are included and also, unfortunately, the completely unproved assertion

that foot and mouth disease may be carried to Great Britain by the yearly migratory movements of Continental birds.—C. HORTON SMITH.

UBACH, F. A., & CLER, G. O. (1944.) Cardiopatias en los equinos. [**Heart diseases of the horse.**]—*Rev. Vet. Fom. Equino, B. Aires.* **4**, No. 14. Reprint pp. 16. **1800**

The authors report four cases of heart disease in horses, as sequelae of various bacterial or parasitic conditions. In all cases, recovery from the disease was followed by weakness at work with dyspnoea, followed by oedema of the lower parts of the body. Valvular sounds were identifiable in all cases.

At autopsy congestion of the abdominal organs was noted, except in the case following trypanosomiasis, where there was general ischaemia, congestion being observed only in the liver. In all cases the lungs had varying degrees of congestion, oedema and emphysema. In two cases, following adenitis, and a typhoid-like fever, there was hydropericardium. Otherwise, the lesions were confined to the endocardium. In the adenitis, there was a longstanding sclerosis round the auriculo-ventricular valves, with fibrinous vegetations of more recent formation on the valves themselves. In the cases following the typhoid-like disease and meningo-encephalitis there were again areas of sclerosis, and a more recent haemorrhagic and erosive condition of the endocardium, particularly the auriculo-ventricular valves. In the case following trypanosomiasis the endocarditis was of a simple haemorrhagic, erosive type and the authors believe that this was secondary to the disease. In the other cases, they believe that the zones of sclerosis were caused by some former disease, and formed a seat for acute or subacute endocarditis in the more recent infections.—R. M. LOOSMORE.

SHARABRIN, I. G. (1941.) Serdechno-sosudistaya nedostatochnost' u loshadei. [**Cardiovascular insufficiency in horses.**]—*Trud. XV Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Diseases of Horses.*] pp. 256–261. **1801**

S. discusses organic and functional cardiovascular insufficiency in horses, concluding that their differentiation by ordinary clinical examination is often impossible. In his investigations, as well as electro-cardiography and various functional tests, he used a sphygmotonograph of his own construction [see *V.B.* **16.** 197] which enabled graphic registration of arterial pressure to be made and was an instrument suitable for use in general practice. S. also discusses electrocardiograms and graphic curves in horses affected with valvular insufficiency, myocarditis, alveolar emphysema and hypertony. —A. MOLDAWSKY.

PERKINS, E. M. (1944.) **Goat's milk anemia. Report of a case.**—*J. Pediat.* **25**. 439–442. [Abst. in *Biol. Abstr.* Sect. F. **19**. No. 3. 10, slightly amended. Signed: HYMAN GOLDSTEIN.] **1802**

A case of goat's milk anaemia in an infant four months old is described. There was a lack of response to iron, diet and transfusion therapy, but the hyperchromic, pernicious anaemia-like blood picture responded when liver extract was administered intramuscularly. There are marked differences of opinion among recognized authorities as to the characteristics, causes and proper treatment of this form of anaemia.

HUEPER, W. C. (1946.) **Experimental studies in cardiovascular pathology. XII. Atheromatosis in dogs following repeated intravenous injections of solutions of hydroxyethylcellulose.**—*Arch. Path.* **41**. 130–138. [Author's summary copied *verbatim.*] **1803**

Hydroxyethylcellulose of three grades of viscosity dissolved in isotonic solution of sodium chloride was injected intravenously into dogs without eliciting any acute and serious untoward reactions.

The most viscous hydroxyethylcellulose caused the most pronounced symptoms (leukopenia, accelerated erythrocytic sedimentation, anemia) characteristic of the macromolecular hematologic symptom complex.

The medium viscous hydroxyethylcellulose produced the most pronounced hemodiluting action.

Storage phenomena in the liver cells and the glomerular endothelial cells, as well as atheromatous and fibrous intimal lesions and medial degenerations and calcifications, were most extensive and most widely spread in the dogs which received injections of solutions of the low viscosity material. Such reactions were entirely absent in the dogs treated with the high viscosity preparation.

STEINBERG, B., & MARTIN, R. A. (1946.) **Absorption of scar tissue in experimental nodular cirrhosis of the liver. With a method of visualizing cirrhotic changes.**—*Arch. Path.* **41**. 1–10. [Authors' conclusions copied *verbatim.*] **1804**

Connective tissue which is laid down in nodular cirrhosis induced by a butter yellow diet is reabsorbed in part or completely after the animals have been returned to a normal stock diet. There is also partial or complete restoration of the structural integrity of the hepatic parenchyma. The improvement becomes apparent within six weeks after the animal has returned to a normal diet. An approximate period of five months is required for significant absorption of connective tissue.

The progressive changes in nodular cirrhosis of the liver of the rat and the gradual return of the normal structure can be delineated roentgenographically by injecting intracardially a colloidal suspension of thorium dioxide.

The development of nodular cirrhosis and the return to normal are neither uniform in all animals nor uniform in the liver of the same animal.

GIZATULLIN, K. G. (1940.) K voprosu o "steril'nom entsefalite" u laboratornykh zhivotnykh. ["**Sterile encephalitis" in laboratory animals.**]—*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Collected Works.*] pp. 168–186. **1805**

Intracerebral and subdural injection into rabbits and cats of a 10% suspension of brain tissue from healthy cats and rabbits in physiological saline or in 50% glycerin produced no ill-effect. Similarly, injections into the rabbit brain of blood serum alone or of cerebrospinal fluid alone, from either the rabbit or the horse, were also harmless. Brain tissue, however, that had previously been "macerated" in the cerebrospinal fluid (the "cerebrolysate") of animals either similar to, or different from, the host, rapidly produced on injection into the brain symptoms of acute "sterile encephalitis". These symptoms are described in detail; rabbits were more susceptible than cats. Brain tissue could be replaced by either lymph node or muscle tissue with similar results, although the resulting nervous syndrome was less acute and in no case fatal. "Cerebrolysate" autoclaved before injection produced no harmful reaction.

The formation of the "cerebrolysate" was due to a lysing action of the cerebrospinal fluid on the particular tissue employed. This was shown histologically and by the use of the biuret reaction. As judged by the intensity of the colour of the reaction, lysis is maximal on the fourth or fifth day and is speeded up by a rise in temperature.

A detailed histological study, illustrated with

photomicrographs, of the brains of injected rabbits, appeared inconclusive. The primary symptom appeared to be a regressive, exudative inflammation.

The action of neurotoxins in producing "sterile encephalitis" is considered to be of a general rather than of a specific nature.—L. Levenbook.

Menkin, V. (1946.) **Leukopenia and inflammation. The presence of a leukopenic factor in inflammatory exudates.**—*Arch. Path.* **41.** 50–62. [Author's conclusion copied *verbatim*.] **1806**

A leukopenic factor is present in inflammatory exudates of dogs, particularly if the exudate gives an acid reaction. When injected into the blood stream of a normal animal, the leukopenic factor causes a rapid fall in the number of circulating leukocytes. In its present state of purification it is found as a rule to be closely associated with pyrexin, the substance primarily concerned in the development of the fever associated with inflammation. It can be dissociated from the pyrogenic factor by subjecting pyrexin to incomplete hydrolysis, which inactivates the pyrogenic factor. The evidence on hand does not as yet prove conclusively that the leukopenic factor is a substance separate from pyrexin. It may be only a separate factor in pyrexin. Further studies are in progress to establish this point. Preliminary observations indicate the probable polypeptide nature of the leukopenic factor.

Appelmans, M., & Gathy, J. (1943.) Kératite par poils de chenille "Porthesia similis". **[Keratitis caused by the hairs of a caterpillar (*Porthesia similis*).]**—*Ann. Soc. belge Méd. trop., Bruxelles.* **33.** 1–11. [Dutch summary.] **1807**

The authors describe a case of keratitis in a girl caused by a caterpillar falling into the eye. Severe pain, oedema and inflammation occurred after a short time. When the eye was examined on the following day, numerous hairs from the caterpillar were seen implanted in the cornea. Conjunctivitis, ulceration and opacity followed. The caterpillar hairs could be seen embedded in the cornea and were still surrounded by nodular granulations after five months. The incidence of eye lesions caused by caterpillars is briefly discussed.—M. C.

White, R. G., & Rowlands, W. T. (1945.) **An hereditary defect of newly-born lambs.**—*Vet. Rec.* **57.** 491–492 & 493. **1808**

An account is given of a condition in newly-born lambs which superficially resembles swayback. Affected animals show lack of co-ordination in all limbs, often struggling in vain to rise. Some are blind and deaf and do not respond to external stimulae. None is capable of sucking. Autopsy shows no gross anatomical abnormality of any organ. Bacteriological examinations have been consistently negative. No blood copper deficiency has been detected. All cases so far have been confined to one flock and it is probable that the condition is hereditary in origin. Further investigations are being made.—D. D. Ogilvie.

See also abst. **1689** (chronic ulcerations in rabbits), **1894** (disease control by the R.A.V.C.), **1917** (livestock diseases in New Zealand), **1919** (in Nigeria), **1920**, **1921** (in Uganda), **1922** (in Ceylon), **1924**, **1925** (in the U.S.A.), **1926** (in Panama).

NUTRITIONAL AND METABOLIC DISORDERS

*Prüfer, J. (1942.) Wie lassen sich die Verluste durch Gicht und Erkrankungen der Legewerkzeuge mit Hilfe der Fütterung und Haltung günstig beeinflussen, ohne dadurch den normalen Eiertrag zu beeinträchtigen. **[Relation of feeding and maintenance to loss from gout and diseases of the laying system in fowls.]**—*Arch. Kleintierz.* pp. 1–27. [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **50.** 473–474.] **1809**

Various protein feeding stuffs were fed at three levels to 450 Leghorn pullets during 11½ months, and their effect on egg production and health was observed. No difference in egg production was noted between the fowls receiving the highest protein diet (30%) and those receiving the medium diet (20%), but a low level of protein (10%) caused a decrease. 12–15% protein in the diet is recommended as the optimal level.

Chopped sweet lupins had an adverse influence on egg production and were therefore unsuitable for use as the sole source of protein, while whale meal caused a deterioration of health. Very good results were obtained with skim milk, especially when it was fed *ad lib.* No change in the mortality rate was observed when high protein diets were fed, except in the case of whale meal which markedly increased mortality. It is suggested that neglect by breeders of the constitution of breeding birds accounts for the increase in diseases of the laying system.—R. Morganstern.

Glynn, L. E., Himsworth, H. P., & Neuberger, A. (1945.) **Pathological states due to deficiency of the sulphur-containing amino-acids.**—*Brit. J. exp. Path.* **26.** 326–337. **1810**

The authors used diets in which all the N was supplied in the form of amino acids, to demonstrate in rats deficiency states corresponding to lack of the S-containing amino acids, methionine and cystine.

In mild cases methionine deficiency produces anorexia, cessation of growth and even wasting. In more severe cases hypoproteinaemia develops, together with a severe anaemia characterized by anisocytosis, polychromasia, poikilocytosis and conspicuous reticulocytosis, and tending to be hyperchromic and macrocytic. There is also proliferation of type A normoblasts in the bone marrow. The anaemia is not associated with deficient intake of iron.

Cystine deficiency causes massive necrosis of the liver, but rats fed on a diet deficient in cystine but containing large amounts of methionine grew normally and developed no pathological lesions. In addition to anorexia, loss of appetite, anaemia, hypoproteinaemia and hepatic necrosis, a diet deficient in both methionine and cystine produces an excretion in the urine of a chromogen similar to, or identical with homogentisic acid. This may be due either to deficiency of cystine or to extreme deficiency of methionine or to both.—H. Scott McTaggart.

I. Bowstead, J. E., Sackville, J. P., & Sinclair, R. D. (1942.) **The development of cobalt deficiency in sheep.**—*Sci. Agric.* **22.** 314–325. **1811**

II. Bowstead, J. E., Sackville, J. P., & Sinclair, R. D. (1942.) **The efficacy of cobaltized salt for the prevention of cobalt deficiency symptoms in sheep.**—*Ibid.* 479–481. **1812**

I. Fifty ewes maintained on a basal ration consisting of non-leguminous hays and ground oats similar to those commonly fed to sheep in Alberta, plus a mineral supplement of iodized salt and monocalcium phosphate, were divided into two groups so that 15 received an extra supplement of 4 mg. Co twice weekly as the chloride, and the other 35 received only the basal ration over a period of 19 months. Analysis of the feeding stuffs showed an average Co content of 0·01–

0·03 p.p.m. which was less than the average Co content of 0·04 p.p.m. obtained from typically "bush-sick" areas in New Zealand.

The ewes not fed cobalt became unthrifty, with loss of appetite and listlessness resulting in loss of weight, and were on an average 13–15 lb. lighter at the end of the experiment than the Co-fed ewes. Tissue analysis showed that the Co content of blood, liver and kidneys was lower than that of healthy animals, and a reduction in Hb red cell count and volume was observed associated with the loss in weight. Reproduction was impaired in that lambs from affected ewes were smaller and weaker than those from unaffected ewes, with a consequent very high lamb mortality.

II. 24 ewes in good condition were divided into two experimental groups, so that each group contained seven ewes that had previously received a cobalt chloride solution for approximately 20 months, and five that had received Co for two months following the development of Co deficiency symptoms. Over an experimental period of 300 days one group received a solution containing 4 mg. Co twice weekly giving a total of approximately 344 mg. Co for each ewe, and the other group was fed a salt mixture containing 4 oz. cobalt chloride per ton which supplied approximately 219 mg. Co per ewe; the basal ration for both groups was deficient in Co but otherwise adequate.

The ewes were all in good condition at the end of the period and there were no significant differences in average growth, reproduction and fleece weight between the two groups. It was therefore concluded that the feeding of cobaltized salt supplying approximately 5·1 mg. Co weekly was as satisfactory for maintaining sheep on a low Co ration in good condition as giving 8 mg. Co weekly in solution.—R. ALLCROFT.

HILL, W. L., REYNOLDS, D. S., HENDRICKS, S. B., & JACOB, K. D. (1945.) **Nutritive evaluation of defluorinated phosphates and other phosphorus supplements. I. Preparation and properties of the samples.**—*J. Ass. off. agric. Chem., Wash.* **28.** 105–118. **1813**

BIRD, H. R., MATTINGLY, J. P., TITUS, H. W., HAMMOND, J. C., KELLOGG, W. L., CLARK, T. B., WEAKLEY, C. E., Jr., & VAN LANDINGHAM, A. H. (1945.) **Nutritive evaluation of defluorinated phosphates and other phosphorus supplements. II. Defluorinated phosphates as phosphorus supplements for chicks.**—*Ibid.* 118–129. **1814**

ELLIS, N. R., CABELL, C. A., ELMSLIE, W. P., FRAPS, G. S., PHILLIPS, P. H., & WILLIAMS, D. E. (1945.) **Nutritive evaluation of defluorinated phosphates and other phosphorus supplements. III. Utilization experiments with rats.**—*Ibid.* 129–142. **1815**

[Absts. in *Biol. Abstr.* Sect. F. **19.** No. 7. 20, slightly amended. Signed: J. E. WEBSTER.]

[See also REYNOLDS *et al.*—*V. B.* **16.** 271.]

I. Directions are given for the laboratory preparation of a large number of P-containing compounds which were later used in solubility studies. They included the following Ca-phosphates: metaphosphate in two crystalline modifications and in the vitreous form, pyrophosphate in three crystalline modifications, hydroxylapatite, and silicocarnotite. Also included in the work were samples of defluorinated phosphates, slags and metaphosphates, bone products and natural phosphates, and superphosphates and dicalcium phosphates. Five tables are given which contain a description of the compounds or mixtures, their P content, and the solubility of both 0·5 g. and 1 g. samples in ammonium citrate solution, citric acid solution (2%), and 0·4% HCl. Finely divided and poorly crystallized preparations of pure compounds were more soluble than coarse and well crystallized material. Vitreous Ca metaphosphate and most Al and Fe phosphates were highly soluble in neutral ammonium citrate. Bone meal is highly soluble, phosphate rocks are moderately soluble and natural aluminum phosphate is poorly soluble.

II. Six samples of defluorinated superphosphate and one each of defluorinated phosphate rock, phosphate slag, Ca pyrophosphate and vitreous Ca metaphosphate were tested in three laboratories to determine their effectiveness as sources of P for bone formation in growing chickens. The effects of these materials on the percentage of bone ash and on growth were compared with the corresponding effects of tricalcium phosphate and bone meal. Judged by its effect on bone ash, one sample of defluorinated superphosphate was almost completely unavailable; the other five samples were available but less so than bone meal and tricalcium phosphate. Defluorinated phosphate rock, phosphate slag and vitreous Ca metaphosphate were intermediate in availability between the superphosphates on the one hand and bone meal and $Ca_3(PO_4)_2$ on the other. The Ca pyrophosphate was almost completely unavailable. The parallelism between availability and solubility in 0·25% HCl at 38°C. was such that the determination of solubility could be used as a quick approximate measure of availability. At levels equivalent in P content to 2% of bone meal, each of the supplements appeared to have a detrimental effect on growth during one experiment of eight weeks' duration. The metaphosphate had an unfavourable effect on growth when fed at a level equivalent to 1% bone meal.

III. Rat tests on these products were carried on at five laboratories with the specific procedure left to the individual laboratory. In all tests, however, young rats were fed for short periods on basal diets low in P and Ca to which was added the test material in graded amounts to give equal, or multiple levels of P. Criteria for evaluating these test materials included the growth, blood P level, P retention, and bone ash. Defluorinated phosphate rock prepared by the fusion process, compared favourably with bone meal or Ca phosphate as a Ca and P carrier. One phosphate slag was rated as good and another as fair in availability. Commercially defluorinated superphosphates showed considerable variation in availability, ranging from reasonably good to poor. The form in which Ca phosphate exists has an important bearing on its availability. Comparison of solubility data in dilute HCl, citric acid, and neutral ammonium citrate with the ratings of availability according to the rat-feeding tests, showed good correlation from the group standpoint between the first two named reagents and the ratings, although no one solvent was entirely dependable in measuring the availability of the individual products.

LEWIS, J. M., & WILSON, L. T. (1945.) **Vitamin A requirements in calves.**—*J. Nutrit.* **30.** 467–475. **1816**

Depletion of vitamin A reserves, as judged by cessation of growth, was carried out in 26 Holstein calves 2–9 days old by maintaining them on a ration nearly devoid of vitamin A. During the depletion a low grade type of pneumonia occurred in some of them and two died; there was evidence P.M. that 13 had had pneumonia. Diarrhoea occurred in some but disappeared after vitamin A supplements were given. The calves were divided into six groups of four each and 32, 64, 128, 256, 512 and 1,024 U.S.P. units of vitamin A per kg. body weight were fed to each group respectively. Blood vitamin A determinations were carried out on each calf at the end of the depletion period and at approximately monthly intervals after receiving the supplement.

Two calves in each group received the supplement for four and eight months respectively and were then killed.

The results indicated that an intake of 32 units per kg. body weight just covered the minimum requirement of young calves. At this level they grew fairly well but not as well as those receiving larger supplements. There was evidence of night blindness in only one of the four calves in this group and histological examination showed none of the characteristic changes of vitamin A deficiency, but the vitamin A blood level was low (24–27 U.S.P. units per 100 ml.) and there was little or no liver storage. Maximum growth was obtained on 64 units per kg. An intake of 512 units was necessary to give maximal plasma values; below this level, plasma values were proportional to the intake. Liver storage was variable but in general values were low for calves receiving 32, 64 and 128 units per kg., moderate for those receiving 256 and 512 units and high for those getting 1,024 units.

The results indicate that for both growth and moderate liver storage an intake of 250 U.S.P. units per kg. or 11,000 units per 100 lb. live weight is required and that for practical purposes the blood level of vitamin A is a more sensitive indicator of the vitamin A status of the animal than is its adaptation to darkness. —R. Allcroft.

Reid, J. T., Huffman, C. F., & Duncan, C. W. (1945.) **The therapeutic effect of yeast and pyridoxine on poikilocytosis in dairy cattle.**—*J. Nutrit.* **30.** 413–423. **1817**

In studies on the production and alleviation of poikilocytosis, 42 calves and four cows with large open rumen fistulae were used. Many of the calves received a whole milk and cereal breakfast food (Rice Krispies) ration; others received the individual farm ration supplemented with different factors known to stimulate haemopoiesis. Young calves were most commonly affected with poikilocytosis while the incidence in mature animals was limited; blood smears from the four cows with open or unplugged fistulae showed the presence of 15–99% poikilocytes.

The addition of a mineral mixture supplying 250 mg. iron, 250 mg. manganese, 25 mg. copper and 5 mg. cobalt daily had no effect on the poikilocytosis although a noticeable increase in the haemoglobin level resulted from their supplementation. The feeding of 200 g. of dried brewers' yeast or 100 g. "live" yeast daily was effective in alleviating the condition within 3–4 weeks. Addition of several of the B-complex vitamins contained in yeast showed that neither riboflavin nor nicotinic acid altered the shape of the poikilocytes but administration of pyridoxine resulted in a specific response; 5–20 mg. daily brought about slow recovery and 40 mg. effected complete recovery in 3–4 weeks.

The occurrence and degree of severity of poikilocytosis were independent of the haemoglobin content, red blood cell count, r.b.c. volume or the plasma concentration of Ca, inorganic P or Mg.

From these results it is suggested that the primary defect responsible for the occurrence of poikilocytosis in the bovine is a lack of or interference with normal ruminal activity.—R. Allcroft.

Neander, G. (1942.) **The effect of vitamin C on the number of granulocytes in the blood.**—*Acta med. scand.* **109.** 453–459. **1818**

A series of experiments on human beings indicated that there is a relationship between plasma ascorbic acid levels and the number of granulocytes present in the blood, low vitamin C values corresponding to fewer granulocytes and higher vitamin C values to increasing numbers of granulocytes. The administration of ascorbic acid either *per os* or by subcutaneous injection, was followed by increases in the number of granulocytes (neutrophile, eosinophile and basophile leucocytes). —R. Allcroft.

Atkins, W. R. G., & Fisher, R. A. (1944.) **The therapeutic use of vitamin C.**—*J. R. Army med. Cps.* **83.** 251–252. **1819**

In an experiment to ascertain the vitamin C reserves of troops, it was found that men dosed with the vitamin after food became saturated and excreted excess ascorbic acid sooner than men dosed before having food. Statistical analysis of the results showed that the difference between the two groups was significant. It appears therefore that vitamin C is utilized better after intake of other food.—R. Allcroft.

Kjos-Hanssen, J. (1943.) Heste-krampe (eller "Stall-krampe") (alias "Ku-krampe" eller "Fjøs-krampe"). ["**Stable cramp" or hypocalcaemia in mares.**]—*Norsk VetTidsskr.* **55.** 116–118. **1820**

The author states that "stable cramp" [milk fever] is rare in Denmark, but cites a case in a mare with a healthy 3-month-old foal. After heavy ploughing the previous day she was found with a temperature of 37·5°C. standing stiffly, twitching, straining the neck, refusing food, and with retention of urine. The intravenous injection of 80 g. calcium gluconate and 4 g. boric acid dissolved in 2 litres of sterile water gave immediate relief. Urine was passed and in a short time the animal was behaving normally.—M. E.

See also absts. **1798** (diet and six-day chick disease), **1824** (vitamin K), **1917** (cobalt).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Friedberg, L. (1944.) **The effect of renal vein occlusion on the blood pressure of the dog.**—*Amer. Heart J.* **28.** 786–793. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 8. 13, slightly amended. Signed: Morris Wilburne.] **1821**

Complete bilateral renal vein occlusion in trained dogs produced death from uraemia in 1–5 days; there was no associated hypertension. Necropsy revealed intense renal congestion, and in some instances rupture of the renal capsule with extra-renal haemorrhage. Partial renal vein occlusion at times induced transient, slight hypertension and azotaemia which disappeared following the development of extensive capsular venous collaterals. One animal exhibited moderate but fluctuating hypertension sustained over a period of two years. Re-occlusion of the collateral venous network occasionally resulted in a pronounced hypertension sustained for several months; this was possibly due to an appreciable interference with venous flow, or to fibrous renal compression. Histologically, the kidneys disclosed chronic passive congestion, slight connective tissue proliferation, and cloudy swelling of the tubular epithelium. Small focal haemorrhages with lymphocytic infiltration were also present. The glomeruli revealed no significant changes, nor were changes noted in the arteries, arterioles, or veins.

*Wolpers, C., & Zwickau, K. (1942.) Zur Frage der

Erythrozytenmembran. **[The membrane of the erythrocyte.]**—*Fol. Haemat.* **66.** 211–221. [Abst. from abst. in *Wien. tierärztl. Mschr.* **30.** 78.] **1822**

With the help of the electron microscope, erythrocytes were shown to have a membrane 20–30 mμ in thickness.—B. CINADER.

WACHSTEIN, M. (1946.) **Alkaline phosphatase activity in normal and abnormal human blood and bone marrow cells.**—*J. Lab. clin. Med.* **31.** 1–17. [Author's summary and conclusion copied *verbatim.*] **1823**

In films of normal human blood, a varying proportion of neutrophilic leucocytes showed alkaline phosphatase activity. The number of positive cells, as well as the intensity of the reaction, increased markedly in infections. The leucocytes in purulent exudates showed strong activity. In bone marrow preparations from normal individuals, as well as from those suffering from infections, a much larger proportion of positive reacting cells was found than in the circulating blood, suggesting that phosphatase activity is already acquired by the leucocytes in the bone marrow. Eosinophiles, as well as lymphocytes, including the abnormal lymphocytes seen in infectious mononucleosis, are devoid of phosphatase activity. In twelve of thirteen patients with lymphatic leucemia, the leucemic cells showed no phosphatase activity. In fourteen patients with acute myeloblastic leucemia, the immature cells were phosphatase negative and there was apparent lack of activity in the remaining granulocytes in two patients. The depression of activity in neutrophiles was more marked in patients with chronic myeloid leucemia, only two of thirteen showing phosphatase activity in these cells comparable to that seen in normal blood films. In one instance of nonleucemic myelosis, many granulocytes gave a strong phosphatase reaction.

Circulating nucleated red blood cells showed only occasional activity in their nuclei. These cells were mostly phosphatase negative in bone marrow preparations from normal subjects but were more frequently the site of enzymatic activity in bone marrow of patients suffering from infections as well as from different kinds of anemias.

Among different animals the neutrophiles (heterophiles) of the guinea pig, rat and rabbit, and most of the nucleated red cells of the frog showed strong alkaline phosphatase activity, while the blood cells of the chicken, mouse, and dog were negative.

The increased enzymatic activity in neutrophiles under inflammatory stimuli signifies probably increased cell metabolism. While no practical application of the phosphatase reaction for hematologic purposes can so far be recognized, the depression in activity in the granulocytes of chronic myeloid leucemia is of some interest.

QUICK, A. J. (1946.) **Effect of synthetic vitamin K and of quinine sulfate on the prothrombin level.**—*J. Lab. clin. Med.* **31.** 79–84. [Author's summary copied *verbatim.*] **1824**

1. Synthetic vitamin K compounds (menadione, synkayvite, and hykinone) given in relatively large single doses caused no demonstrable hyperprothrombinemia in rabbits, dogs, or man.

2. Vitamin K did not elevate the prothrombin of one individual who has a consistent level of approximately 45 per cent. Since the patient's mother and sister likewise have the same concentration of prothrombin, it can be concluded that this trait is congenital and hereditary. The condition should therefore be called congenital hypoprothrombinemia.

3. Quinine sulfate in daily doses of 0·33 Gm. caused no decrease in the prothrombin of the blood.

4. The significance of hyper- and hypoprothrombinemia is discussed.

WAKIM, K. G. (1946.) **The effects of adrenalin and pembutal anesthesia on blood constituents before and after splenectomy.**—*J. Lab. clin. Med.* **31.** 18–29. [Author's summary and conclusions copied *verbatim.*] **1825**

The effects of adrenalin and of nembutal anesthesia on the concentrations of hemoglobin and plasma proteins, and on the red and white blood cell counts, were studied in intact and splenectomized dogs. The lateral surface area of the spleen was determined under nembutal anesthesia before and after administration of adrenalin. The following conclusions can be made from this study:

1. Intravenous administration of adrenalin increases the concentration of hemoglobin and of the red cell count in circulating blood to a much greater extent in intact than in splenectomized dogs.

2. Nembutal anesthesia causes hemodilution with a reduction in hemoglobin concentration and in the red cell count and a slight reduction in the plasma protein concentration.

3. The size of the spleen in dogs under nembutal anesthesia was decreased about 66 per cent by intravenous administration of adrenalin.

4. The blood squeezed out by the spleen during its contraction under the influence of adrenalin had an average hemoglobin concentration of about 11 per cent higher than that of jugular blood.

KOSTIN, A. A. (1940.) Dvigatel'naya funktsiya zheludochno-kishechnovo trakta i perevarivanie uglevodnykh komponentov korma v norme i pod vliyaniem kalomelya, khloral-gidrata i glauberovoĭ soli po opytam na fistul'nykh loshadyakh. **[Motor function of the gastro-intestinal tract and digestion of carbohydrates under the influence of calomel, chloral hydrate, and Glauber's salt in experiments on horses with fistulae.]**—*Rabot. XIII Plen. vet. Sekt. Akad. sel'khoz. Nauk, Moscow, 1939.* [*Collected Works.*] pp. 51–58. **1826**

Calomel exerts an activating effect on the motor function of the gut for 1–2 hours after administration of 7 g. *per os*; in consequence major peristaltic waves are increased in intensity, but this does not apply to minor peristaltic waves.

The intravenous injection of 150–200 ml. of a solution containing 15–20 g. chloral hydrate slightly depresses this motor function; 7 g. of the drug in 100 ml. 30% alcohol increases it slightly. A 25% solution containing 100–300 g. sodium sulphate administered *per os* exerted a purgative action, hastening the evacuation of the stomach contents. None of these substances had any activating effect on the digestion of carbohydrates in the gut.—L. LEVENBOOK.

MANWARING, W. H. (1944.) **Hereditary sperm groups.**—*Calif. West. Med.* **61.** 233. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 3. 1, slightly amended. Signed: M. L. ILSLEY.] **1827**

Hereditary antigenic groups have been demonstrated in the sperm cells of mice—probably two groupings have been found so far. The relation between hereditary sperm grouping and hereditary blood groupings has not yet been determined.

*MARTINS, T., DO VALLE, J. R., & PORTO, A. (1942.) Efeitos do tratamento prolongado de cadelas com o propionato de testosterona. **[Effect of prolonged administration of testerone propionate on bitches.]**—*Mem. Inst. Butantan.* **16.** 237–241. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 10, slightly amended. Signed: A. C. WALTON.] **1828**

Prolonged injections of testosterone propionate caused slight but quite permanent masculinization of the genitalia of both adult and juvenile normal and castrated ♀ dogs.

SOLOVEI, M. Y. (1945.) Vliyanie prodolzhitel'nosti zhizni spermatozoidov v polovykh organakh samki na oplodotvorenie i razvitie ploda. [**Fertilization and development of the young as influenced by the length of life of sperms in the sexual tract of the female.**] —*Iskusstv. Osemen. sel'khoz. Zhivotn.* **2.** 195–200. **1829**

Rabbits were inseminated with about 100 million spermatozoa 10, 20, 25 and 30 hours before ovulation and examined P.M. 2–14 days later, whilst similar control groups were allowed to bear litters.

Does mounted by vasectomized bucks were inseminated up to ten hours before ovulation. In all cases, development and the young were in every respect normal. Insemination 20 hours before ovulation was less successful; the numbers of corpora lutea in the ovaries exceeded the numbers of embryos present and some of the latter in the same female were in a state of degeneration. Two of the control does produced deformed, stillborn young. With insemination 25 hours before ovulation, the number of actual and potential young was very much reduced and division of the ova was both slow and abnormal. Amongst the controls only one doe produced two, belated, stillborn young. Increasing the number of sperms at insemination to 500 million improved the litters. No young were produced from insemination 30 hours before ovulation although an occasional fertilized egg was found.—L. L.

STURKIE, P. D., & WILLIAMS, A. G. (1945.) **Studies on pregastrular development, early embryonic development, and hatchability of prematurely laid eggs of the hen.**—*Poult. Sci.* **24.** 546–554. **1830**

Studies were made of the effect of arrested development of the blastoderms of hens' eggs upon their subsequent development and hatchability, with particular reference to the production of twins and abnormalities; the time after fertilization and the stage of development reached by blastoderms at which such arrests made resumption of development impossible were also studied.

Premature eggs were obtained at known times after fertilization by injecting pitruitrin into hens. Eggs which were obtained 13½ hours after fertilization, cooled and incubated failed to undergo early development. Of eggs obtained 14½ hours after fertilization and then cooled only 33% had undergone considerable development; such eggs incubated immediately after laying had about 75% of the embryos alive or developed to a high degree. In less than 33% of the embryos of eggs obtained at 15½ hours and cooled before setting was there inhibition of early development; when such eggs were incubated immediately after laying, 80% were found to be alive or to have undergone appreciable development.

All eggs obtained 19½ hours and some of those obtained 15½ hours after fertilization were incubated full term and allowed to hatch. The percentage hatched was low, especially in the 15½-hour group.

Two cases of embryonic doubling are described which were attributed to the treatments employed.

Studies of the state of development of blastoderms revealed that in the 13½-hour blastoderm the boundary between the central marginal cells was distinct whereas in the 15-hour blastoderm, cells from the central area had invaded the periblast, which had become organized.
—A. EDEN.

*ROMANOFF, A. L. (1944.) **Bio-electric potentials and vital activity of the egg.**—*Biodynamica.* **4.** 329–358. [Abst. in *Exp. Sta. Rec.* **93.** 273, copied *verbatim.*] **1831**

From the time avian eggs are laid to the beginning of incubation, electrical potentials are greater in fertilized than in unfertilized chicken eggs (0·8 mv. against 0·2 mv.). The magnitude of the bio-electric potentials can be increased by electrical stimuli, by X-ray and ultraviolet radiation, by high-frequency fields, and possibly by an increase in the oxygen concentration. "It is certain that the source of energy for the development of electric potentials is the metabolic activity of the organism."

WISHART, D. S. (1944.) **Artificial insemination of livestock.**—*Aust. vet. J.* **20.** 347–354. **1832**

W. deals in a comprehensive manner with the collection of semen, the management of males, frequency of service, methods of examination of semen and the significance of various findings, the use of diluents, and storage and transport of semen. A table summarizes a number of characters of semen from the stallion, bull, ram and boar. The relation of oestrus and ovulation, conception rates and the advantages and disadvantages of artificial insemination of mares, cows, ewes and sows are briefly summarized. The article concludes with short notes on artificial insemination societies in the U.S.A. and the cost of running a "centre", but adds little new information.—H. MCL. GORDON.

I. MILOVANOV, V. K., & SHERGIN, N. P. (1945.) Usovershenstvovanie tekhniki iskusstvennovo osemeneniya korov, ovets i koz. [**Improvements in the technique of artificial insemination in cows, sheep and goats.**]—*Iskusstv. Osemen. sel'khoz. Zhivotn.* **2.** 5–32. **1833**

II. KEDROV, V. K. (1945.) Prakticheskaya proverka usovershenstvovaniĭ v tekhnike iskusstvennovo osemeneniya krupnovo rogatovo skota. [**A practical demonstration of the improvement in artificial insemination technique in cattle.**]—*Ibid.* 33–35. **1834**

I. In an account of ten years' work, the authors deal with the manner in which artificial insemination can be effected economically with simplified apparatus.

The construction and use are described of a double-walled, tinplate, water-heated jacket, designed to prevent temperature shock to sperms on ejaculation into the semen receptacle of the artificial vagina; this may be used for bulls, rams or goats. Graduated capsules containing semen sufficient for single inseminations were prepared from thin paper impregnated with paraffin or wax. In such capsules, semen was stored until required and then introduced by a special capsule holder into the vagina of sheep or goats, or into the cervix uteri of cows, where it was crushed and the semen expelled.

A technique is described for calculating sperm viability based on time taken to decolorize a standard solution of methylene-blue. Detailed instructions are given for the manufacture of new simplified vaginae using materials readily available. Details of simplified instruments for introducing semen capsules and of a vaginoscope are also given. For injecting semen directly into the uterus of pigs and horses, a simple syringe was devised, whilst for the storage and transport of semen, a special ice-box replaced the more usual vacuum flask.

II. As evidence of the efficiency of the simplified apparatus and technique described in I, K. states that of 250 cows so treated 91·6% were artificially brought into calf. Nearly all of the remaining 21 cows were subsequently found to be sterile.—L. LEVENBOOK.

SHERGIN, N. P., & NESMEYANOVA, T. N. (1945.) Svoĭstva sokhranënnoĭ spermy. Soobshchenie 1. Osemenenie romanovskikh ovets sokhranënnoĭ spermoĭ. [**The properties of stored semen. I. Insemination of " Romanovsky " sheep with stored semen.**] —*Iskusstv. Osemen. sel'khoz. Zhivotn.* **2.** 169–171. **1835**

GLEMBOTSKIĬ, Y. L., SHERGIN, N. P., & NESMEYANOVA, T. N. (1945.) Svoĭstva sokhranënnoĭ spermy. Soobshchenie 2. Osemenenie ovets prekos sokhranënnoĭ spermoĭ. [**The properties of stored semen. II. Insemination of " Prekos " sheep with stored semen.**] —*Ibid.* 172–178. **1836**

In these two papers, the authors deal with experiments designed to determine the influence of the storage of sheep semen on the viability and the type of progeny produced. The semen was kept at 15°–20°C. in open vials filled to a depth of 2–4 mm.

I. In the first series of experiments a Romanovsky breed of sheep was employed. It was found that 30–50% of semen samples stored for 24 hours deteriorated, and were, presumably, unfit for use but this percentage could be lowered by improvement of the ram's nutrition and less frequent ejaculation. [It is pointed out that the animals, particularly the rams, were very undernourished when received for experiment; this should be borne in mind in considering the results.] When stored semen was used, 2·5% less ewes bore lambs, the ratio of the number of lambs per ewe being 1·93 : 2·09. Newly born lambs from ewes inseminated with stored semen were on the average 6% heavier. No other differences were observed.

II. Similar experiments were performed on a Prekos breed of sheep, in an attempt to verify the above results. The motility of the Prekos semen deteriorated much more slowly than that of the Romanovsky sheep, only 10–15% of the samples being considered unsatisfactory after two days; nevertheless, its fertilizing capacity deteriorated rapidly, only 42% of the ewes becoming pregnant after artificial insemination with semen stored for two days. Thus, whereas with the Romanovsky semen the fertilizing capacity parallels motility, with the Prekos semen the fertilizing capacity decreases more rapidly than the motility, the accepted criterion of sperm viability.

Comparison of stored with fresh Prekos semen showed that semen stored for 1–2 days has only half the fertilizing power of the fresh semen and produces 6·8% fewer lambs. Lambs produced from the stored semen are almost invariably heavier at birth, and, possibly correlated with this, their death rate during their suckling period is 6·8% less. Again, no other differences were noticed.

In a final comparison of the two series of experiments, the different behaviour of the stored semen from the two breeds is stressed, and tentative explanations are suggested.—L. LEVENBOOK.

HAYS, F. A. (1945.) **Male sex hormones and artificial light as activators in the spermatogenesis of adult males.**—*Poult. Sci.* **24.** 66–71. **1837**

The male birds, cockerels, yearlings and two-year-olds, in 12 breeding pens were treated during February and March as follows :– Four received 2 ml. of pregnant mare serum (67 I.U. of sex hormone per ml.) on alternate days for 32 days; four received artificial light supplied by ordinary electric light bulbs for three hours every day for 41 days; four acted as controls and received no sex stimulating treatment.

There was no evidence that any of the treatments affected the fertility records of the cockerels or yearlings, but one two-year-old male receiving P.M.S. gave a significantly higher fertility record than a male of the same age that received artificial light. H. concludes from these results, that P.M.S. may be useful in activating old males to higher fertility during the early spring hatching season.—J. D. BLAXLAND.

SEIFERLE, E. (1943.) Darf das Pferd für die Gebäudebeurteilung des Hundes ohne weiteres als Vorbild gebraucht werden ? [**Can the anatomy of the horse be used as the example of that of the dog ?**]—*Berl. Münch. tierärztl. Wschr. Wien. tierärztl. Mschr.* June 11th. 183–186. **1838**

S. concludes that because of phylogenetic considerations the horse cannot be taken as a basic model for appreciation of the structure of the dog. Both have developed the power of speed, but apart from this, they have little in common. The dog is carnivorous and has acquired the characteristics of a predator. In consequence, its alimentary tract is simple and specialized for mastication and the digestion of concentrated food and the muscles are highly developed and capable of quick energetic action, as opposed to sustained effort. The alimentary tract of the horse is complicated and has developed in keeping with its small feeds of a herbivorous diet, while its locomotory properties allow of prolonged effort both in search of food and in avoiding enemies.

Structural comparison is also made with regard to weight-bearing properties. The horse has bones, ligaments, tendons and tendinous intersections of muscles arranged to enable passive support of a relatively large weight in the standing position with the minimum of muscular effort. The dog, however, is poorly developed in this respect and weight can only be sustained by active muscular effort; therefore, to avoid muscle fatigue, it sits or lies down whenever possible. As an example of this the author discusses the nature of the ligamentum nuchae. In the horse it is large and passes from the skull to the well-formed spines of the thoracic vertebrae, whereas in the dog it is small and passes from the axis to the relatively poorly developed thoracic spines. The dog, therefore, requires stronger muscles passing from skull to neck to assist support of the head. Two line drawings are given in support of this argument.—C. W. OTTAWAY.

VAN LIERE, E. J., NORTHUP, D. W., & STICKNEY, J. C. (1944.) **A comparative study of the action of various anesthetic agents on the muscles of the colon in the dog.**—*Anesthesiology.* **5.** 597–604. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 14, copied *verbatim.* Signed : J. S. LUNDY.] **1839**

The effect of $CHCl_3$, cyclopropane, diethyl ether, divinyl ether, ethyl bromide, ethyl chloride and N_2O were studied on the motility of the intact colon on lightly barbitalized dogs. $CHCl_3$, diethyl ether and divinyl ether practically abolished colonic contractions and produced a decrease in tone. Occasionally $CHCl_3$ and divinyl ether caused a spasm of the colonic musculature. Cyclopropane, ethyl bromide and ethyl chloride produced a spasm of the muscles of the colon as soon as they were administered. N_2O also produced a spasm even though administered in concs., high enough to produce a severe degree of anoxia. This indicated that the stimulating action of the N_2O predominated over the degree of anoxia which accompanies high concs. of N_2O.

—. (1942.) **Annual review of biochemical and allied research in India. Vol. XII for 1941.** pp. xviii+84. Bangalore, India : Society of Biological Chemists. 8vo. Rs. 3. 6 sh. **1840**

This volume contains the following articles :– " Enzymes ", by K. V. GIRI & P. SHESHAGIRI RAO ;

"General nutrition" (diet survey, basal metabolism and deficiency diseases), by S. RANGANATHAN & A. R. SUNDARARAJAN; "Vitamins" (chiefly vitamin A, ascorbic acid and nicotinic acid), by BASHIR AHMAD & R. C. GUHA; "Protein, carbohydrate and fat metabolism", by K. P. BASU & M. N. BASAK; "Pharmacology" (sulphonamides, alkaloids and venoms), by B. B. DIKSHIT; "Animal nutrition" (experimental work on vitamins A and C and digestibility, fluorosis and mineral requirements), by S. C. RAY.—N. B. DAS.

See also abstr. **1877** (hormonal therapy), **1902, 1903** (haematology), **1917** (bovine lactation).

POISONS AND POISONING

SPIRA, L. (1946.) **Fluorine alopecia.**—*J. Hyg., Camb.* **44.** 276–283. [Author's summary copied *verbatim.*] **1841**

A high proportion of young men in this country suffer from premature baldness. Alopecia is not a disease entity but one of the outstanding features of chronic fluorine poisoning (fluorosis). It is frequently associated with dystrophies of other organs of ectodermal origin, namely, those of the skin and its other appendages, the teeth and nails. Since all these organs are regulated by the parathyroid glands, it is concluded that alopecia, too, is produced by fluorine acting through the medium of these endocrine glands. By its ability to precipitate the calcium content of the body, fluorine may lay the foundation for alopecia already in intrauterine life, or produce it at any time after birth.

The action of fluorine is closely similar to that of thallium. There is ample evidence to show that in both fluorosis and chronic thallium poisoning the vegetative nervous system is vitally involved.

Toxic alopecia due to fluorine is preventable.

WYON, P. H. (1945.) **Four cases of Russell's viper bite.**—*Brit. med. J.* Dec. 29th. 919–920. **1842**

Details are given of four cases of Russell's viper bite in human beings. Prompt treatment by ligation, incisions, venesection and the use of antivenene is advocated, accompanied by transfusion of whole blood. The active principles of the venom, thrombase, haemorrhagin and an unspecified proteolytic ferment are discussed in relation to various aspects of the treatment. —A. EDEN.

MATTIS, P. A., MCKINNEY, S. E., PATCH, E. A., & WILLIAMS, E. L. (1946.) **An evaluation of the toxicity of certain sulfonamides for young chickens.** —*Poult. Sci.* **25.** 59–64. **1843**

In view of the suggested value of sulphamerazine and of a mixture (SS2) of sodium sulphamerazine, sulphathalidine and sodium carbonate in the treatment of coccidiosis, the authors investigated the possible toxic effects of these drugs on chickens.

Groups of chicks were fed on diets containing 0·5% and 1% sulphamerazine, and 0·5% and 1% SS2. One group served as a control. The birds were weighed and blood samples were taken for the determination of the sedimentation rate, haematocrit reading, total erythrocyte counts, differential leucocyte counts and concentration of haemoglobin at the beginning, at the seventh day and at the end of the experiment. Determinations of the free and total sulphonamide concentration in the blood were made at intervals during the test. Histopathological examinations on a wide selection of tissues were carried out on the 14th day.

It was found that the addition of these sulphonamides to the diet for 14 days did not retard growth rate; there was no significant change in the haematology and no striking pathological changes were found. The authors concluded that the administration for therapeutic purposes of sulphamerazine or SS2 in a dosage of 1% or less of the diet would not give rise to serious toxic manifestations.—J. D. BLAXLAND.

BLOOD, D. C., & STEEL, J. D. (1944.) **Observations on the cyanogenetic properties of linseed "nuts". Part II. Clinical syndrome in sheep.**—*Aust. vet. J.* **20.** 338–343. [For part I, see *V. B.* **16.** 200.] **1844**

The syndrome was characterized by lassitude and muscular twitchings, beginning at the head and progressively involving the neck and trunk. These were followed by ataxia, convulsions and respiratory arrest. Rapid and difficult respiration, tachycardia, peripheral circulatory collapse, cyanosis, nystagmus and trismus were also observed. Hyperaesthesia and terminal vomiting, not previously recorded in hydrocyanic acid poisoning, were also seen.

The symptoms were considered to be referable to anoxia of the central nervous system. Histotoxic anoxia, produced by hydrocyanic acid, is suggested as the primary cause of death. Since ruminal contents were found in the trachea and bronchi of seven out of nine sheep which died, and vomiting was observed in four of these cases, it is suggested that stimulation of the vaso-vagal reflex may be a contributory or precipitating cause of death. Evidence eliminating nitrate or nitrite poisoning or water intoxication as the aetiological agents is presented.

Though the train of circulatory symptoms is suggestive of a definite pattern, confirmation is required before they can be accepted.

See also absts. **1796** (poisoning of fowls), **1891-1893** (food poisoning), **1924** (sodium chloride poisoning of chicks in Kentucky).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

STEYN, D. G. (1945.) **Modern therapeutics. A review of the use of sulphonamides and of penicillin and other antibiotics from bacteria and moulds as therapeutic agents.**—*J. S. Afr. vet. med. Ass.* **16.** 70–81. **1845**

S. continues a review of some of the more recent observations on the sulphonamides [see *V. B.* **14.** 173] and surveys the antibiotics from moulds and bacteria. The advantages of penicillin as compared with those of the sulphonamides are emphasized. He also refers to the serious abuse of sulphonamides and to a number of cases of poisoning by therapeutic doses of sulphonamides and of hypersensitiveness to these drugs. An ever-increasing number of sulphonamide-persistent strains of bacteria is being produced.—E. M. ROBINSON.

MCILWAIN, H., & HUGHES, D. E. (1945.) **Biochemical characterization of the actions of chemotherapeutic agents. 3. Relationships between metabolic and growth inhibitions by pantothenate analogues; their structural and species specificity.**—*Biochem. J.* **39.** 133–139. [For part 2, see *V. B.* **15.** 144.] **1846**

MCILWAIN, H. (1945.) **Biochemical characterization of the actions of chemotherapeutic agents. 4. Time**

relationships between metabolic and growth inhibitions by pantoyltaurine.—*Ibid.* 279–284. **1847**

3. Widely different amounts of pantoyl taurine are required to inhibit the growth of streptococci, *Corynebacterium diphtheriae* and *Proteus morganii* in the presence of equal concentrations of pantothenate. The organisms all inactivate pantothenate and this inactivation is inhibited by pantoyl taurine. Several amides related to pantothenate were able to inhibit growth of the organisms and prevent the destruction of pantothenate. Two compounds inhibited growth, but the inhibition was not reversed by added pantothenate; these compounds did not prevent pantothenate destruction by the organisms.

4. Pantoyl taurine in low concentrations will prevent the commencement of growth of β-haemolytic streptococci, but even higher concentrations have only a delayed action on growing cultures. Growing organisms destroy pantothenic acid—this destruction is inhibited by pantoyl taurine. The delay in action of pantoyl taurine on growing bacteria is probably due to the organisms' being able to use pantothenic acid which was previously made in excess.—E. BOYLAND.

BOYD, E. M., CLARK, K. L., & ELLIOTT, R. C. (1945.) **The choleretic action of the allyl ester of cinchophen (atoquinol).**—*J. Lab. clin. Med.* **30.** 943–947. [Authors' summary slightly amended.] **1848**

Atoquinol and cinchophen were given by mouth in a dose of 0·1 g. per kg. of body weight to 15 unanaesthetized dogs with chronic biliary fistula, hepatic bile being collected and analysed daily.

Atoquinol and cinchophen had a choleretic effect (*i.e.*, augmented the output of hepatic bile of normal composition) which was present for 2–3 days.

There was little quantitative difference between the effects of the two drugs. Both increased the 24 hour volume output of hepatic bile, increased its specific gravity slightly but consistently and caused a decrease in its relative viscosity, an increase in the concentration of its total solids, an increase in its potassium content, an increase in its inorganic phosphate content, and no change in the concentration of sodium, chloride, total fatty acids, total cholesterol, ester cholesterol, free cholesterol, bilirubin, and bile acids.

*SCHLOEMER, H. F., MAHER, F. T., & WIRTH, E. H. (1945.) **A study of the responses of intact canine uteri following orally administered ergot alkaloids.**—*J. Amer. pharm. Ass.* Sci. Edit. **34.** 94–96. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 13–14, slightly amended. Signed: F. T. MAHER.] **1849**

Uterine contractions were recorded by means of per-vaginal intra-uterine balloons in each of two series of ten bitches. Responses to ergonovine maleate and to ergotamine tartrate given orally were recorded and compared with normal behaviour over a period of four hours. The onset of uterine contractions and the development of maximum intensity of response were on an average 10·3 and 46·3 min. respectively after administration of ergonovine maleate, and 25·7 and 59·8 min. respectively after administration of ergotamine tartrate. These differences were neither sufficiently distinct nor sufficiently uniform to validate this procedure for the separate bioassay of the two types of alkaloidal activity present in ergot. It is evident that in the dog, alkaloids of the ergotamine-ergotoxine type contribute significantly to the actions of orally administered ergot preparations.

SCHATZ, A., & WAKSMAN, S. A. (1945.) **Strain specificity and production of antibiotic substances. IV. Variations among actinomycetes, with special reference to Actinomyces griseus.**—*Proc. nat. Acad. Sci.* **31.** 129–137. [Abst. in *Rev. appl. Mycol.* **24.** 426, copied *verbatim*.] **1850**

A strain of *Actinomyces griseus*, characteristically producing streptomycin, gave rise to variants producing no aerial mycelium and no streptomycin and showing other properties distinct from the parent strain. Sporulating and streptomycin-producing strains, comparable to the original, were isolated, however, from the non-sporulating variants. The original strain had all the properties of *Streptomyces*, whereas the inactive variant could be classified within the genus *Nocardia*. The authors, therefore, raise the question as to what extent many of the species of *Nocardia*, isolated from natural substrates, represent variants of *Streptomyces* spp. which have lost the capacity of producing aerial mycelium.

CURRAN, H. R., & EVANS, F. R. (1945.) **Penicillin as a sporicidal agent.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 262–265. **1851**

Penicillin is sporicidal towards spores of *Bacillus subtilis*, *B. megatherium*, and *B. stearothermophilus*. The sporicidal action is usually greater in milk than in water and is usually increased by sublethal heating (85°C. for 10 min.) of the spores before treatment with penicillin. —E. BOYLAND.

ARMSTRONG, C. D., HALPERN, R. M., & CUTTING, W. C. (1945.) **Prolongation of the action of penicillin after intramuscular injection.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 74–76. **1852**

The blood concentration of penicillin in men and in dogs remains high for a longer period if the injection is made with a solution containing 5% glucose in place of saline.—E. BOYLAND.

KIRBY, W. M. M., MARTIN, S. P., LEIFER, W., & KINSMAN, J. M. (1946.) **Maintenance of therapeutic blood concentrations of penicillin for twenty-four hours following single injections of penicillin-beeswax-peanut oil mixtures.**—*J. Lab. clin. Med.* **31.** 313–316. [Authors' summary copied *verbatim*.] **1853**

Effective therapeutic concentrations of penicillin are maintained in the blood stream for twenty-four hours or longer following single subcutaneous injections of 600,000 units of penicillin in beeswax-peanut oil. Results following intramuscular injections are somewhat less satisfactory than with the subcutaneous route.

ANON. (1945.) **Penicillin X and oil injections.**—*Amer. prof. Pharmacist.* **11.** No. 1. 41–44. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 41, slightly amended. Signed: GRETA OPPE.] **1854**

This article treats the newest and most promising type of penicillin, called "factor X". Three types of penicillin have been discovered in the product extracted from media used for the cultivation of *Penicillin notatum* and the related mycologic organisms: Penicillin F or penicillin I, penicillin G (penicillin II) and "penicillin X", termed "factor X". This last is sometimes called "allopenicillin".

LEOPOLD, I. H. (1945.) **Intravitreal penetration of penicillin and penicillin therapy of infections of the vitreous humour.**—*Arch. Ophthal.* **33.** 211–216. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 13, slightly amended.] **1855**

The penetration of penicillin into the vitreous humour of normal rabbit eyes and eyes with experimentally inflamed anterior segments was measured following several methods of administration. Intravitreous and intramuscular routes failed to produce detectable levels in the vitreous of normal eyes when 4,000 Oxford units of Na penicillin per kg. body weight were used. Even the higher levels occurring in the vitreous of the inflamed

eyes after injection by these methods did not exceed 0·08 units per ml. Injections of penicillin into the subconjunctiva and anterior chamber produced levels above 0·2 units per ml. in the vitreous of normal eyes and even greater concentrations in the vitreous of inflamed eyes.

The following modes of penicillin administration were compared for therapeutic effectiveness against a standard vitreous infection: direct intravitreous, subconjunctival, intravenous and into the anterior chamber. The infections were produced by a diluted 18-hour broth culture of haemolytic *Staphylococcus aureus* known to be sensitive in serum to 0·05–0·02 Oxford units of penicillin. Intravenous injections of penicillin failed to stop the progression of the infections. Repeated subconjunctival injections of penicillin and injections into the anterior chamber halted the progress of infection in four of ten rabbit eyes. Intravitreal injections halted the progress of infections in all eyes receiving one injection of more than 500 Oxford units of penicillin. All forms of therapy were instituted two hours after inoculating the vitreous with the infecting organism.

SHWARTZMAN, G. (1946.) **Studies on the nature of resistance of Gram-negative bacilli to penicillin. Antagonistic and enhancing effects of amino acids.**—*J. exp. Med.* **83.** 65–88. [Author's summary copied *verbatim*.] **1856**

The susceptibility of *E. coli* and *Salmonella* to penicillin is highest in a basal medium devoid of amino acids. Blood serum in certain concentrations, meat infusion broth, yeast extract, and casein hydrolysate interfere with the penicillin activity. The effect is apparently due to the antagonism of certain amino acids in the materials.

Dicarboxyl-monoamino acids (*i.e.*, aspartic, glutamic, and hydroxyglutamic acids and asparagine) cystine, arginine, histidine, and hydroxyproline are capable of suppressing the effect of penicillin upon Gram-negative organisms.

The antagonism of amino acids is not primarily related to their effect upon the rate of bacterial growth.

It is suggested from the experiments detailed, that the antipenicillin activity is due to the effect of the amino acids upon bacterial metabolism.

Prepassages in media of various concentrations of antagonistic amino acids alter the resistance of *E. coli* to penicillin. The changes are in inverse relation to the concentration of the antagonists.

The antipenicillin activity of amino acids may be reversed significantly by *dl*-methionine. The substance, however, reverses only incompletely the antagonism of materials of mixed composition; *i.e.*, casein hydrolysate, meat infusion broth, and serum.

Upon addition of methionine, methionine sulfoxide, and threonine, there occurs a marked enhancement of penicillin susceptibility of broth cultures of *Brucella*, *Eberthella*, *Salmonella* and *Shigella*. The enhancement is apparently due to the ability of this amino acid mixture to reverse effectively the action of the antagonists present in the cultures.

Methionine is essential for the enhancement of penicillin susceptibility. Threonine and methionine sulfoxide facilitate the effect of methionine following a reciprocal quantitative relationship.

BIGGER, J. W. (1946.) **Synergic action of penicillin and sulphathiazole on Bacterium typhosum.**—*Lancet.* **250.** 81–83. [Author's summary copied *verbatim*.] **1857**

Using broth freed from sulphonamide-antagonising substances by the method of Harper and Cawston, sulphathiazole was found to inhibit the growth of *Bact. typhosum* to a considerable extent. It had some bactericidal effect, but only on a small inoculum.

Penicillin in concentrations up to 8 units per c.cm. reduced but did not prevent the growth of *Bact. typhosum* in broth.

The combination of penicillin and sulphathiazole had a pronounced bactericidal effect on *Bact. typhosum*. Penicillin (4 units per c.cm.) with sulphathiazole (10 mg. per 100 c.cm.) sterilised broth containing 70,000 *Bact. typhosum* per c.cm. Penicillin (1 unit per c.cm.) with sulphathiazole (10 mg. per 100 c.cm.) sterilised broth containing 7,000 *Bact. typhosum* per c.cm.

Suggestions are made for the treatment of typhoid fever by penicillin and sulphathiazole.

ABRAHAM, E. P., & DUTHIE, E. S. (1946.) **Effect of pH of the medium on activity of streptomycin and penicillin and other chemotherapeutic substances.**—*Lancet.* **250.** 455–459. [Authors' summary copied *verbatim*.] **1858**

An increase in the acidity of the medium decreases the antibacterial activity of the basic substances streptomycin and proactinomycin; on the other hand it increases that of the acidic substances penicillin, mycophenolic acid, and helvolic acid.

The most likely explanation is that the ionised forms of the basic drugs compete with hydrogen ions, and those of the acid drugs with hydroxyl ions, for position on the cell surface.

Since tissue damage is accompanied by an increase in local acidity, a concentration of a basic drug which is effective in the blood may be inadequate to destroy bacteria in local lesions.

LEHR, D. (1945.) **Inhibition of drug precipitation in the urinary tract by the use of sulfonamide mixtures. I. Sulfathiazole-sulfadiazine mixture.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 11–14. **1859**

The solubility of a sulphadiazine-sulphathiazole mixture is higher than that of either drug alone and the toxicity of the mixture for rats is lower than that of either drug alone. On the other hand the antibacterial activity appears to be the sum of that of the two drugs Clinical trials of such mixtures should be carried out.

—E. BOYLAND.

MØLLER, F., & PETERSEN, A. (1944.) **The bactericidal and growth-inhibiting effect of polythiosol and euthiosol on Staphylococcus aureus.**—*Acta path. microbiol. scand.* **21.** 596–608. [In English.] **1860**

Analyses of euthiosol and polythiosol show them to be acid solutions of polythionic acids and colloidal sulphur. They inhibit the growth of staphylococci by reason of their acidity, although the polythionic acids and hydrogen sulphide have some bactericidal action.

—E. BOYLAND.

GOETCHIUS, G. R., & LAWRENCE, C. A. (1946.) **Further studies on the antibacterial action of 3′,5′-dibromosulfanilanilide.**—*J. Lab. clin. Med.* **31.** 336–339. [Authors' summary copied *verbatim*.] **1861**

1. The activity of 3′,5′-dibromosulfanilanilide has been compared to that of sulfadiazine and sulfathiazole against such organisms as *G. tetragena*, *Streptococcus agalactiae*, *Str. viridans*, *L. monocytogenes*, *H. ducreyi*, *Brucella abortus*, *Brucella melitensis*, *Brucella suis*, and *A. bovis*.

2. A greater bacteriostatic effect and a far greater bactericidal effect was exerted by 3′,5′-dibromosulfanilanilide than by sulfadiazine or sulfathiazole against these organisms.

MANWARING, W. H. (1945.) **Tuberculostatic action of streptomycin.**—*Calif. West. Med.* **62.** 157.

[Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 40, slightly amended.] **1862**

Streptomycin proved effective in the treatment of experimentally produced TB. in g. pigs.

ASHESHOV, I. N., & STRELITZ, F. (1945.) **An antibiotic substance active against *Mycobacterium tuberculosis*.**—*Science.* **101.** 119–120. **1863**

A strain of *Aspergillus fumigatus* isolated initially as a contaminant and grown at room temperature on Czapek-Dox medium containing 2% corn syrup was found to produce substances active against Gram-positive cocci, Gram-negative bacilli and some acid-fast bacilli. Two different substances appeared to be involved, one of which was active *in vitro* against staphylococci and *M. tuberculosis*, strain BCG. The crude dry substance was active against BCG in a dilution of at least 1 : 1,400,000. Against avian TB., however, no bactericidal action was observed even in dilutions as low as 1 : 100. So far, both substances have been obtained only in crude form and efforts are being made to purify them. Animal experiments are being deferred until purer material is available.—D. D. OGILVIE.

FELDT, A. (1943.) Kultur- und Tierversuche mit Sulfonamiden bei Gasödemerregern. [***In vitro* and *in vivo* investigations on sulphonamides and the organisms causing gas gangrene.**]—*Klin. Wschr.* **22.** 742–744. [Abst. in *Bull. Hyg., Lond.* **19.** 972, copied *verbatim*. Signed : F. HAWKING.] **1864**

Studies were made of the effect of sulphonamides upon the growth of gas gangrene organisms in a fluid medium. The minimal bacteriostatic concentration of sulphanilamide for *Cl. welchii*, *Cl. septicum*, and *Cl. histolyticum* was 1 : 1,000 to 1 : 50,000, the minimal concentration of sulphapyridine, sulphathiazole, sulphadiazine and globucid (2 sulphonamido 5 ethyl thio diazol), was 1 : 20,000 to 1 : million (read after 48 hours incubation) ; the minimal concentration of marfanil (*p*-aminomethyl-benzenesulphonamide) was 1 : 10,000 to 1 : 100,000. The bacteriostatic action of globucid and sulphadiazine was more than ten times as strong as that of marfanil. *Cl. oedematiens* was inhibited by marfanil and globucid 1 : 10,000 but not by the other compounds.

Experiments in mice proved difficult because the virulence of the cultures varied greatly. When mice were infected with *Cl. septicum* and treated by mouth, sulphadiazine was the most active compound saving 13 mice out of 21 ; marfanil saved only 1 out of 18. With *Cl. welchii* the results were similar ; globucid and sulphadiazine saved mice in doses of 0·2 or 0·1 mgm. per 1 gm. mouse, while marfanil exerted only doubtful action in doses of 2 mgm. Infections of *Cl. oedematiens* resisted marfanil and all the sulphonamides tested.

Feldt concludes that globucid and sulphadiazine are much more effective against the organisms of gas gangrene than marfanil or other sulphonamides.

SCHAEFER, H. (1944.) Weitere Untersuchungen zum Mechanismus und zur Therapie des Wundstarrkrampfs. [**Further research upon the mechanism and treatment of the spasms in tetanus.**]—*Arch. exp. Path. Pharmak.* **203.** 59–84. [Abst. in *Bull. Hyg., Lond.* **19.** 971–972, slightly amended. Signed : G. PAYLING WRIGHT.] **1865**

This study is concerned exclusively with the spasms of "local tetanus", which was produced experimentally in g. pigs by the injection of toxin at several sites in a specified muscle.

The first section of the paper is a continuation of the author's earlier work (1940) upon action currents arising in muscles which have been intoxicated with tetanus toxin. At various intervals after such injections, the gastrocnemius muscle was exposed and electrodes were placed upon sites in the muscle and its nerve for the purpose of obtaining records of their action currents with a cathode-ray oscillograph. The stimulus applied to excite contraction was the sudden pull of a small weight upon a cord attached to the tendo Achillis.

The application of this stimulus to the intoxicated muscle was followed by a prolonged discharge of action currents from the muscle : these ceased immediately its nerve was divided. A similar stimulus to a healthy muscle evoked only the usual single reflex twitch with its accompanying undulant action current. A single electrical stimulus to the motor nerves to healthy and intoxicated muscles excited a single contraction in the former but a prolonged spasm in the latter. During the persistence of this spasm, a series of action currents, due to impulses passing in a centrifugal direction, could be detected in the sciatic nerve. The author believes that centripetal impulses are also passing along this nerve at this time, but that their action currents are masked by the greater intensity of those due to the efferent motor impulses.

The author then describes experiments designed to distinguish between the possibilities (a) that the spastic condition of the intoxicated muscle is dependent upon a local disorder that is confined to the affected muscle, and (b) that it is due to some change in the spinal cord that is brought about by the escape of toxin from the site of injection. He concludes that his findings are explicable only on the supposition that the injury is essentially peripheral, and that an important factor underlying the spasm is an accompanying hyper-irritability of the local proprioceptive sensory nerve endings in the muscle. He summarizes his belief that the spastic phenomena of local tetanus are associated with three types of local disorder : (a) the heightened irritability of the proprioceptive system ; (b) the hyper-activity of the motor end plates in the muscle ; and (c) the purely muscular spasms characteristic of the late stages which have been designated "contractures" by the physiologists. Although for technical reasons it is difficult to exclude the occurrence of concomitant changes in the cord, the phenomena of local tetanus can be explained satisfactorily without any such assumption.

The later sections of the paper describe attempts to analyse the mechanism of local tetanus by investigating the following questions : (a) whether the spastic muscle contains an increased quantity of acetylcholine ; (b) whether tetanus toxin destroys cholinesterase *in vitro* ; and (c) whether any of the drugs that are known to affect the activity of motor end plates are also capable of modifying the spasms of local tetanus.

Both healthy and intoxicated (7–25 days) muscles were denervated by cutting the sciatic nerves, and their respective acetylcholine contents were determined by two methods. According to one of these, there was little difference between the corresponding pairs, but according to the other, the acetylcholine content of the intoxicated muscle was definitely raised. The author gives reasons for preferring the latter result.

Since from the above observation and from other sources, there seems to be evidence that tetanus toxin inhibits the action of cholinesterase, different mixtures of toxin and enzyme were incubated aseptically at 37°C. for varying periods up to three weeks. The cholinesterase was obtained from several sources—horse-leeches, chicken embryos and human and horse serum—and any changes in its enzymic activity were estimated by two methods every second day.

In a typical experiment, no significant differences were found in the activity of an enzyme preparation

obtained from chick embryo when the concentration of the tetanus toxin varied from 1 : 10 to 1 : 80,000. The possibility that tetanus toxin inhibits the action of cholinesterase *in vitro* can thus be excluded.

The possible action of certain drugs in lessening the spasms in local tetanus was studied upon more clinical lines. Since such spasms are not always accompanied by action currents, any variations in the activity of affected muscles were estimated by the aid of a simple mechanical device whose construction is described. Subcutaneous injections of concentrated preparations of cholinesterase were relatively ineffective : they were almost without action on the contractures present in intoxicated muscles after their denervation. Prostigmine rather unexpectedly lessened the spasm, but the dose required was very large and the effect transitory ; serious after-effects, moreover, exclude the possibility of using this drug on man. Glutathione, urea, thiamine and adrenalin, all of which are known to affect the action of cholinesterase, had little mitigating influence. Much the best results were obtained with very small doses of veratrine ; and this drug would seem worthy of clinical trial in local tetanus.

BRATTON, A. C., Jr. (1945.) **Continuous intravenous chemotherapy of *Plasmodium lophurae* infection in ducks.**—*J. Pharmacol.* **85.** 103–110. **1866**

The assessment of antimalarial activity of drugs administered to ducks by the oral route is sometimes complicated by the incomplete absorption of the drugs from the intestine or by their partial destruction in the alimentary canal. B. treated white Pekin ducks, infected with *P. lophurae*, for three days with a continuous intravenous infusion containing the drug ; this was accomplished by the use of a simple rotary injection pump. On the basis of dosage, quinine was more effective at the level of minimum therapeutic response when given intravenously in single daily doses than by continuous infusion ; the converse was true at a high level of response. Cinchonine was equally as effective at the level of minimum response when given in single daily intravenous doses, or continuously. Tartar emetic, sodium antimony thioglycollate and mapharsen were effective in doses at or near the toxic level. Penicillin, streptomycin, and quitenidine were inactive at the dosages employed. On the whole, results suggested that quinine, quinacrine, and pamaquine each possess a different principal mechanism of drug action against *P. lophurae* in the duck.—C. HORTON SMITH.

I. TOKIN, B. (1944.) **Effect of phytoncides upon protozoa.**—*Amer. Rev. soviet. Med.* **1.** 237–239. **1867**

II. KOVALENOK, A. (1944.) **Action of phytoncides upon infusoria.**—*Ibid.* 239–241. **1868**

III. TOROPTSEV, I. V., & FILATOVA, A. G. (1944.) **The use of phytoncides in the treatment of infected wounds.**—*Ibid.* 244–250. **1869**

[Absts. in *Bull. Hyg., Lond.* **20.** 426–427, copied *verbatim.* Signed : L. P. GARROD.]

Phytoncides are highly volatile substances given off by onions, garlic and other plants, which are said to differ from their essential oils. Two of these papers describe their lethal effect on various protozoa and the peculiar types of morphological effect accompanying it : death follows in a few minutes when the source of phytoncide and a culture of protozoa are merely placed alongside one another in a closed vessel. Evidence of a similar action on bacteria has been obtained. Studies in rabbits having shown that phytoncides have no serious toxic effect (although changes were observed in the lungs, heart muscle, liver and kidney) and that in experimental wounds healing was accelerated by them and infection subdued, the treatment of suppurating gunshot wounds was attempted by applying a vessel containing freshly prepared onion paste. Only the vapour emitted from this came in contact with the wound surface. The results are described as being highly beneficial. [These very interesting observations are described so briefly that many questions which will occur to the reader's mind are left unanswered. The fact that phytoncides are derived mainly from plants rich in essential oils, such as onion, garlic, mustard and radish, calls particularly for clearer evidence of their distinct identity. Detailed and quantitative data about bactericidal action are also lacking.]

SULKIN, S. E., & GOTH, A. (1945.) **Effect of aspergillic acid on equine encephalomyelitis virus.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 16–18. **1870**

Aspergillic acid did not prolong the life of mice infected with E.E. virus even when the virus and aspergillic acid were shaken together for three hours prior to injection into the mice.—E. BOYLAND.

MITSCHERLICH, E. (1944.) Behandlungsversuche der Kerato-Conjunctivitis infectiosa des Rindes mit Eleudron und Tibatin. [**Experimental treatment of *Rickettsia conjunctivae* infection of cattle with eleudron and tibatin.**]—*Arch. wiss. prakt. Tierheilk.* **79.** 140–147. **1871**

M. points out that the reservoir of rickettsial conjunctivitis is constituted by recovered animals which may harbour the causal organisms for several years ; control of the disease therefore requires a sterilizing treatment for such animals. In view of the success claimed for sulphonamide compounds in the treatment of heartwater and trachoma, two such compounds, eleudron and tibatin, were tested as to their value in the treatment of calves for infective conjunctivitis. Neither drug injected intravenously or subcutaneously proved capable of destroying rickettsia on the conjunctival mucous membrane of calves.—U. F. R.

I. KHANENYA, F. S. (1944.) K istorii preparata K. [**The history of K-preparation.**]—*Zh. Mikrobiol., Moscow.* No. 3. pp. 61–62. **1872**

II. ZHURAVLEV, S. F. (1944.) Bisetylksantogen. Preparat K. [**Bisethylxanthogen (K-preparation).**] —*Ibid.* pp. 62-63 **1873**

[Abst. in *Bull. Hyg., Lond.* **20.** 147–148, copied *verbatim.* Signed : J. R. BUSVINE.]

I & II. A search had been undertaken to find a compound suitable for impregnating garments against body lice so as to give lasting protection. References to bisethyl xanthogen as a remedy for parasites of animals were found in foreign literature. It was tested for human lice and found to be effective. Large quantities were prepared ; the crude liquid (Jidkii) being called substance " J " and the crystalline (Kristalnii) bis-ethyl xanthogen called substance " K ".

The method of manufacture is as follows :—

1. Preparation of potassium ethyl xanthate from alcohol, carbon disulphide and caustic potash :—

$$C_2H_5OH + CS_2 + KOH = C_2H_5O.CS.SK + H_2O.$$

2. Preparation of bisethyl xanthogen as follows :—

$$2C_2H_5O.CS.SK + 2NaNO_2 + 2H_2SO_4 = C_2H_5O.C(S).S.S.C(S).OH_5C_2 + Na_2SO_4 + K_2SO_4 + 2H_2O + 2NO.$$

3. Purification and extraction of the bis-ethyl xanthogen.

The quantities and methods employed for production (on a 50 kgm. scale) are given in some detail.

K-soap is a 50 per cent. mixture of substance K with industrial soap and an emulsifier.

Soboleva, N. I. (1944.) Primenenie preparata K dlya bor'by s pedikulezom. **[Employment of K-preparation for pediculosis control.]**—*Zh. Mikrobiol., Moscow.* No. 3. pp. 64–66. [Abst. in *Bull. Hyg., Lond.* **20.** 148, copied *verbatim.* Signed: J. R. Busvine.] **1874**

Substance K (bis-ethyl xanthogen) is a suitable insecticide for impregnating cloth to render it lethal to body lice. Its insecticidal power was investigated by impregnating small pieces of cloth (either with spirit solution of "K" or with an emulsion of it) and, after drying, putting adult lice on them for various times. The lice were transferred to clean cloth and kept at 28°C. and 70 per cent. relative humidity and examined for mortality one day later. Results with cloth impregnated with a 3 per cent. solution :–

Time on cloth ...	10 min.	50 min.	1 hr.	2 hr.	3 hr.	5 hr.
Per cent. kill ...	25	63	69	81	90	96

Eggs were only laid on cloth impregnated with dilute solutions (0·25 per cent.).

Washing reduces the toxicity of impregnated cloth as follows :–

Impregnation	After 1 wash	2 washes	3 washes
3% solution	94% kill	72% kill	17% kill
10% „	92% „	74% „	67% „

[N.B.—A high control mortality has been allowed for in calculating these percentages from the author's data.]

K-emulsion seems to be more suitable for practical use owing to its convenience and cheapness. It is made up as follows :–

100 parts bis-ethyl xanthogen
70 „ industrial soap
30 „ emulsifier "Petrova".

Cloth soaked in 2 per cent. of this emulsion and dried at room temperature killed all lice in 24 hours.

For practical use, a special impregnating machine has been invented. Underwear to be treated is passed between two rollers covered with fine carding needles. One roller dips into 3 per cent. K-emulsion, and, according to its depth, applies more or less of the liquid to the cloth. About 7–10 gm. of bis-ethyl xanthogen are required per pair of undergarments.

Several thousand men wore impregnated garments for periods up to a month without toxic symptoms. There were a few cases of transitory dermatitis, probably owing to overdosing.

Soboleva, N. I. (1944.) Izuchenie deĭstviya dusta SK v prakticheskikh usloviyakh. **[The study of SK-dust under practical conditions.]**—*Zh. Mikrobiol., Moscow.* No. 3. p. 68. [Abst. in *Bull. Hyg., Lond.* **20.** 148, copied *verbatim.* Signed: J. R. Busvine.] **1875**

Preparation SK is chlorinated turpentine (it is so-called from the Russian word for turpentine, Skipadar). The mild insecticidal powers of the terpines present in turpentine (principally α-pinene) are considerably augmented by chlorination. There is some information published on the halogenation of α-pinene, but the resulting products are not distinguished beyond those incorporating two atoms of chlorine. As a practical measure, the SK preparation is merely standardized by percentage chlorine absorbed, using a consistent grade of home-produced turpentine. The insecticidal power increases from 40 per cent. chlorine up to 60 per cent., and product SK is standardized at 58–60 per cent. Cl. It is a viscous liquid with a specific gravity of 1·49 to 1·53 at 50°C.

Preparation SK is a very useful insecticide for combating lousiness. It is toxic to lice, innocuous to man and very persistent. It can be used as a dust when 8 per cent. is incorporated in talc. Experiments have been made with this SK-dust on infested men working on a communal farm and on detachments of the Red Army. Groups of 16 to 300 men were treated in various tests. It was found that about 30 gm. of the dust applied to the underwear cleared a man of adult lice for about a fortnight. Only small numbers of larvae were observed. Bone meal made a less satisfactory diluent and required a SK content of 15 per cent.

Habermann, R. T. (1945.) **Weekly "salting" with phenothiazine to control parasites.**—*Vet. Med.* **43.** 231–234. **1876**

Fourteen goats and 28 kids were divided into three groups, one group being given a 1 : 7 phenothiazine-salt mixture at weekly intervals, the second being kept continuously on 1 : 10 phenothiazine-salt mixture and the third being kept untreated as controls. Egg counts were made periodically from April 1943 to September 1944 when the first and third groups were slaughtered and worm counts were made. Both methods of treatment were effective in reducing the parasite burden of the treated animals as compared with the controls, but the egg counts of the first group were not as consistently low as those of the second group. It was presumed that the consumption of 5–10 g. of phenothiazine every 2–3 weeks by the animals of the first group resulted in the periodic removal of their worm burden. At P.M. examination it was found that the worm burden of the control group was much higher than that of the first group. The general health of the treated animals was good and no ill-effect was seen from the phenothiazine medication.—T. E. Gibson.

Reece, R. P. (1945.) **Hormonal therapy in relation to veterinary practice.**—*J. Amer. vet. med. Ass.* **106.** 191–200. **1877**

This review of current literature gives examples of reproductive failures in farm animals in which hormonal therapy would be advantageous.

Cows with non-functional ovaries were treated with 20 mg. of stilboestrol, 10 mg. of stilboestrol dipropionate or 10 mg. of oestradiol dipropionate. Out of 189 such cases, 85% came into oestrus, and 74% of those mated conceived. Repeated injections, or an excessive dose may cause the ovaries to become cystic. The use of pregnant mare serum cannot be advised until further trials have been made. Cows which are anoestrous because of corpora lutea in their ovaries can be treated most reliably by expressing these manually, although out of 15 cows injected with oestradiol benzoate, 94% came into oestrus 1–7 days later, and, of ten cows injected with chorionic gonadotropin seven showed signs of oestrus. If P.M.S. is given when a corpus luteum is present ovarian cysts may form and if it is given immediately after their removal multiple ovulations may occur with a danger of multiple births. Experimental results do not justify the use of an oestrogen or anterior pituitary extract for cows with fairly regular oestrous cycles but which either fail to conceive or conceive after repeated services only. However, when 30 such cows were given three intramuscular

injections of 1,000 rat units of chorionic gonadotropin at two-day intervals beginning on the day of service, 56·7% of services were effective, whereas only 6·9% of services were effective in untreated cows. Seven cows with cystic ovaries were given 10,000 R.U. of chorionic gonadotropin, and all came into oestrus from 10-28 days later and conceived either then or at a subsequent period. One intravenous injection of from 0·67–2·5 g. equivalents of acetone-desiccated sheep pituitary powder checked nymphomania in 72 out of 81 cows with cystic ovaries so treated and caused corpora lutea to be formed within 31 days in the ovaries of 74 out of 96 animals; out of the 69 with normal oestrus 53 bred. A second injection was given in 12 cows and six of these also conceived.

In cases of retained placenta 20,000 R.U. of oestradiol benzoate injected subcutaneously followed immediately, or in a few hours, by a subcutaneous or intravenous injection of 5–10 ml. of pituitrin caused more violent uterine contractions than pituitrin alone. Although several cows so injected expelled the placenta promptly and functioned normally, the degree of acute metritis or sterility was not always reduced. Pyometra may be treated with 25 mg. of oestradiol dipropionate or stilboestrol dipropionate, or with two injections of 20 mg. of stilboestrol given with a 4-day interval. Similar doses may be used to effect the expulsion of a mummified foetus. Oestrogenic hormones may be used to induce lactation in barren cattle, but ovarian hypoplasia and nymphomania were usually associated with the implant of 2–5 g. tablets of diethylstilboestrol or hexoestrol and pelvic fractures were sometimes encountered. The best record is that of a 33-month-old barren Jersey which received 273 mg. of stilboestrol dipropionate over a 14-week period and produced 8,046 lb. of milk and 383 lb. of butter fat in 305 days. Oestrogens should not be used on a heifer if it is hoped to breed from her later; continued oestrogenic treatment may cause cystic degeneration of the ovaries. Oestrogens tend to reduce yields in lactating cattle. Testosterone will stimulate the sexual desire of a bull; two intramuscular injections of 1,000 R.U. of chorionic gonadotropin given with a four-day interval restored the fertility of three sterile bulls producing semen with a low sperm count.

Oestrus can be induced in ewes in the early part of the anoestrous period by giving two injections of 250 R.U. each of P.M.S. with a 16-day interval between. Out of 4,000 ewes injected, for the same reason, with 1–1·5 mg. of oestradiol benzoate, 72·5% mated and 43·1% lambed. 200 R.U. of P.M.S., followed 20 days later by 400 R.U. should there be no sign of oestrus, will enable non-lactating goats to be mated during the anoestrous period so that a uniform milk supply may be obtained. 600 R.U. are needed if the goats are lactating. Alternatively lactation may be induced and maintained by eight weekly subcutaneous injections of 5 mg. of oestradiol dipropionate. In mares gonadotropins can be used to precipitate ovulation at a definite time in the oestrous period, for ovulation in mares in oestrus occurs 20–40 hours after the intravenous injection of 1,000–2,000 R.U. of chorionic gonadotropin.

P.M.S. will induce oestrus in mares with dormant cycles, but neither P.M.S. nor horse pituitary extract will produce oestrus during the anoestrous period.

As many hormones are of a protein nature anaphylaxis is, at least theoretically, possible, and adrenalin might be used in its treatment. Because of antibody formation repeated injections may result in a decreased response.—J. O. L. KING.

NEUFELD, F. (1943.) Ueber einige strittige Fragen betreffs der Händedesinfektion. **[On some disputed questions regarding hand disinfection.]**—*Z. Hyg. InfektKr.* **125.** 287–298. [Abst. in *Bull. Hyg., Lond.* **19.** 966, copied *verbatim*. Signed: L. P. GARROD.] **1878**

This paper continues a controversy with GOTTSACKER about the relative merits of alcohol and Zephyrol as skin disinfectants. Neufeld re-quotes his own experiments in which pneumococci on fingers were regularly and totally destroyed by alcohol, whereas Zephyrol only reduced their numbers. He disputes Gottsacker's conclusion that Zephyrol in sub-lethal concentrations reduces bacterial virulence, attributing Gottsacker's error, in this sense, in connexion with pneumococci, to the use of a strain of unstated type and inadequate virulence (Neufeld himself used a fully virulent Type 1 organism), and, in connexion with anthrax spores, to the impossibility of washing the disinfectant out of the pieces of fabric or filter paper used as carriers. The adsorption of Zephyrol and similar disinfectants on experimental material, and their consequent bacteriostatic action, are considered a prolific source of error. Gottsacker's conclusion that alcohol merely fixes bacteria on the skin is met by the observation that from hands artificially infected with a mixture of sporogenous and vegetative bacteria the former, being insusceptible to the action of alcohol, can readily be recovered in profuse growth, although the latter are few or absent in the same culture.

SALLE, A. J. (1945.) **Increased germicidal efficiency of iodine in the presence of an oxidation-reduction system.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 149–152. **1879**

The bactericidal action of iodine against *Staphylococcus aureus* and *Salmonella typhi* is reduced by the presence of organic matter but increased by a mixture of manganous sulphate and ferric sulphate, which acts as an oxidation-reduction agent. The oxidation-reduction solution increased the toxicity to bacteria more than that to chick embryo heart cells.—E. B.

KLEINBERG, J., NOVAK, M., & GERBER, V. (1945.) **Antibacterial properties of some positive univalent iodine compounds.**—*Proc. Soc. exp. Biol., N.Y.* **58.** 238–239. **1880**

Monopyridine iodine *p*-nitrobenzoate is bactericidal against *Staphylococcus aureus*, *Salmonella typhi* and *Clostridium tetani* and is relatively non-toxic and non-irritant. It might be of value as a skin antiseptic. —E. BOYLAND.

HAMBURGER, M., Jr., PUCK, T. T., & ROBERTSON, O. H. (1945.) **The effect of triethylene glycol vapor on air-borne beta hemolytic streptococci in hospital wards. I.**—*J. infect. Dis.* **76.** 208–215. **1881**

PUCK, T. T., HAMBURGER, M., Jr., ROBERTSON, O. H., & HURST, V. (1945.) **The effect of triethylene glycol vapor on air-borne beta hemolytic streptococci in hospital wards. II. The combined action of glycol vapor and dust control measures.**—*Ibid.* 216–225. **1882**

I. The authors demonstrated that the bacterial contamination of the air of hospital wards can be very much reduced by the use of triethylene glycol vapour.

In the first instance, tests were carried out in four scarlet fever wards, two german measles wards and one room containing patients with acute sinusitis. Determination of the number of air-borne haemolytic streptococci was carried out at intervals before, during and after vaporization, by means of an atomizer-sampler drawing measured quantities of air through broth, and gentian violet blood agar plates exposed to the air. Atmospheric humidity was maintained at an even level

in wards under experiment. The triethylene glycol vapour was emitted through an atomizer and dispersed by means of suitably placed electric fans. By this method the number of air-borne β-haemolytic streptococci was reduced by from 38–100%.

II. A second series of experiments was undertaken in which the action of triethylene glycol vapour was supplemented by measures to prevent the dispersal of organisms from secondary reservoirs such as bedclothes, etc., by treating all such articles with a 2% oil emulsion. As a result, the number of air-borne β-haemolytic streptococci was reduced by 93% in quiet periods and by 97% during bed-making periods. The dust control measures alone resulted in a reduction of the bacterial contamination of the air by 86% during periods of activity, but not at all during quiet periods.—J. C. B.

RAE, J. (1944.) **A method of testing absorption from various ointment bases.**—*Brit. J. Derm.* **56.** 92–94. [Abst. in *Brit. med. Bull.* **3.** 197, copied *verbatim.*] **1883**

Advantage was taken of the fact that crystalloids in solution will pass through a cellulose transparent film into distilled water, and the various results obtained probably represent the action of an ointment when applied to the broken skin.

The crystalloid used was sodium chloride in a concentration of 2%. One end of a glass tube, 10 cm. long and 2·5 cm. diameter, was closed by means of a piece of non-moisture-proof cellulose film drawn well up the outside and secured with a rubber band. Twenty-five g. of the ointment was introduced into the tube and gently pressed down against the cellulose. Fifty ml. of distilled water was placed in a small beaker, and the tube, suitably supported, placed in it so that the end covered with the cellulose was immersed to a depth of about ½-inch (about 1·3 cm.). This was left for 24 hours for diffusion to take place, the solution in the beaker being then titrated with N/10 silver nitrate.

In all, 20 bases were tested and the number of ml. of N/10 silver nitrate required was found to vary with the type of base tested; ranging from 0·1 ml. for lard to 23·8 ml. for pectin (100 grade) 5% in distilled water. This latter base plus lanette wax SX 10% gave a figure of 19·0 ml. Methyl cellulose 10% in distilled water required 14·9 ml.

The results obtained show very clearly the advantage of the newer type of non-greasy ointment base.

See also abstr. **1843** (sulphonamide toxicity), **1920, 1921** (treatment of trypanosomiasis), **1774, 1917** (insecticides), **1782** (arsenic resistance in ticks), **1817** (vitamin B complex therapy of poikilocytosis), **1819** (vitamin C therapy), **1839** (anaesthesia), **1842** (snake bite treatment).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

ANON. (1945.) **Pasteurization of milk in Adelaide.**—*Brit. med. J.* Dec. 29th. 928–929. **1884**

It is proposed that in Adelaide, South Australia, a Metropolitan Milk Board be appointed consisting of a chairman, two representatives of the consumers, two of the industry, and one each from the Departments of Health and Agriculture, to exercise complete control over the production, transport, treatment and distribution of the milk consumed in the town. The Board would insist on the regular veterinary inspection and tuberculin-testing of all cows, on the proper cleansing and sterilization of utensils and on the adequate cooling of the milk. They would be responsible for the health of dairymen and would enforce the provision of vehicles in which the milk could be kept at a temperature below 50°F. during transit. All milk would be pasteurized; the methylene-blue test would be employed to ensure its bacterial cleanliness before pasteurization, and the phosphatase test to check the efficiency of the heat treatment.

In Great Britain, although the Milk Reorganization Commission recommended in 1936 that an independent body be appointed to control all stages of milk production, transport, processing and distribution, these different stages are still controlled by separate bodies, and, in spite of the national milk-testing scheme organized by the Ministry of Agriculture during the last three years, the bacterial cleanliness of milk is now no higher than it was before this was started and is lower than before the war. It is suggested that the solution lies in the appointment of one body, as suggested in Adelaide, to supervise all aspects of milk supply.—J. O. L. KING.

CEYLON. (1944.) **Report of the Milk Committee (appointed by the Hon. Minister for Health).** pp. vi+57. Colombo: Ceylon Govt. Press. [Abst. in *Bull. Hyg., Lond.* **19.** 960, slightly amended. Signed: W. G. SAVAGE.] **1885**

This is a very comprehensive and valuable Report on milk production and supply conditions in Ceylon. It is only possible to indicate the essentials of the problem. Milk requirements as a minimum are estimated at 102 million gallons a year. The total production of liquid milk is about 21 million gallons and imports are only equal to 2 million gallons of liquid milk. The total milch cows are given as 241,374 and milch buffaloes 132,985 for the year 1929. The average daily consumption of milk per head of population in 1930–1934 was 1·7 oz. compared with 39 oz. for Great Britain, 7 oz. for India and 56 oz. for New Zealand. [The figures for Great Britain and New Zealand are the liquid milk equivalent of all dairy products.] There is considerable local prejudice against drinking milk, but this is being overcome. The chemical legal standards are 3·5 per cent. fat [England 3·0] and 8·5 per cent. solids-not-fat [England 8·5] and this corresponds with genuine milk in Ceylon. Adulteration is very extensive and for 1939–41 the percentages of genuine milk were only 40, 58, 65 respectively, and were much worse for earlier years.

Milk production is largely unorganized and milk yield per cow is very low. In urban areas there are many "city dairies" with cows treated purely as milk production machines sold off when they become dry. It is recommended that they should be eliminated and their place taken by the suburban or rural dairy farm. Production of milk by co-operative societies has been a success and there is great scope for further development. Collection and distribution conditions are poor, and the Committee suggests that a separate organization should be set up for the collection and distribution of milk. At least in the earlier stages the Local Authority should undertake the sole responsibility for the collection and distribution of milk within its administrative boundaries and sale otherwise should be prohibited. The initial capital expenditure should be met by the Central Government. Apart from these initial expenses, sale prices for milk should be such that the centres are self-supporting. At these central depots the milk will be examined, bulked, cooled, bottled and distributed. As milk in Ceylon is invariably boiled before consumption pasteurization is not considered essential at the present time.

The price of milk to the consumer is high, *i.e.*, 40 to 60 cents a bottle (26 oz.) and it is recommended

that it should be reduced to a minimum consistent with an economic return to the producer. Various methods of achieving this are discussed. A subsidized scheme is recommended whereby every deserving expectant and nursing mother and child under six is ensured the necessary supply.

Proposals are made to improve cattle breeding, to better the feeding and nutrition of cows, to promote better cattle management, and to reduce cattle diseases. An important proposal is the creation of a central Government organization, vested with statutory authority, similar to the Milk Marketing Board in Great Britain. One function will be to implement the recommendations embodied in the report. Apart from this its main duties would be to arbitrate between producers, distributors and consumers, to secure funds and administer the allocation of grants and "to plan future policy and initiate all such measures as may be considered necessary to further the production of milk in this country".

RODKEY, F. L., & BALL, E. G. (1946.) **A rapid test for distinguishing human from cow's milk based upon a difference in their xanthine oxidase content.**—*J. Lab. clin. Med.* **31.** 354–356. [Authors' summary copied *verbatim*.] **1886**

1. Human milk samples from twenty-six individuals showed little or no xanthine oxidase activity. Pasteurized cow's milk, by comparison, is rich in this enzyme.

2. A simple test based upon xanthine oxidase activity is described which permits purchasers of human milk to detect whether dilution of the sample with cow's milk has been performed. The test will consistently detect as little as 10 per cent admixture of cow's milk with human.

*ROSENOW, E. C. (1944.) **Isolation from milk supplies of specific types of green-producing (alpha) streptococci and their thermal death point in milk.**—*Minn. Med.* **27.** 469–474 & 550–556. [Abst. in *Exp. Sta. Rec.* **92.** 262, copied *verbatim*.] **1887**

Report is given of a study of the virulence, cataphoretic velocity, serologic properties, and heat resistance of green-producing or alpha streptococci isolated from milk supplies during epidemics and remote from epidemics and the pasteurization temperature that invariably kills virulent alpha streptococci commonly found in milk. It was found that epidemic strains isolated from patients grew at a higher dilution in brain-containing media than nonepidemic strains or saprophytic organisms. Virulent strains and pathogenic organisms often grew in milk at usual refrigeration temperatures and at higher dilutions in dextrose brain broth and agar than streptococci found in milk supplies remote from epidemics. Those present in milk during epidemics were unusually resistant to heat, often remaining viable after pasteurization for 30 min. at 145·4°F. in the laboratory. The high heat resistance disappeared on artificial cultivation. The relationship of this organism to *Streptococcus durans* and *S. zymogenes* isolated from pasteurized milk by Sherman and Wing was not ascertained.

"Clinical and experimental evidence obtained indicates (1) that raw, and less often pasteurized, milk supplies shown to contain alpha streptococci true to type are probable sources of infection; (2) that during epidemics the streptococci normally present in respiratory and intestinal tracts of persons and broadly present in nature, including milk, acquire virulence and other properties characteristic of the streptococci associated with the respective epidemics; (3) that the incidence of diseases resulting from acquired specific virulence of the streptococci is increased by the drinking of milk containing the specifically virulent organisms. . . . Pasteurization of milk by the holding and flash methods, as now practised, while apparently adequate to kill beta streptococci, nonvirulent alpha streptococci, and other pathogenic organisms commonly present in raw milk, has been found inadequate to kill specifically virulent alpha streptococci commonly present in milk supplies during epidemics of encephalitis, poliomyelitis, respiratory infections, influenza, and hiccup." More efficient methods are needed. It is suggested that milk be pasteurized routinely at 163·4° [F.] for 30 min., at least during epidemics.

MATTICK, A. T. R., & HIRSCH, A. (1946.) **Sour milk and the tubercle bacillus.**—*Lancet.* **250.** 417–418. **1888**

The authors investigated the common belief that the acidity of sour milk is sufficient to kill the tubercle bacillus. To 50 ml. of milk were added 500 or 2,000 human type tubercle bacilli per ml. To one half of this was added 1% by volume of a culture of milk streptococci used in the making of an antibiotic substance (WHITEHEAD, 1933, first demonstrated the antibiotic product of this streptococcus.) Both samples of milk were incubated at 30°C. for two days and both clotted overnight. Centrifuge deposits of both samples were inoculated into g. pigs. The deposit from the milk with added streptococci did not infect any g. pig; but that from the untreated sour milk infected all g. pigs.

This work demonstrates that the antibiotic substance from the streptococcus can kill or render avirulent up to 2,000 virulent human type tubercle bacilli per ml. *in vitro*, and that acidity by itself has no effect on the tubercle bacillus, in the concentration reached in sour milk.—R. M. LOOSMORE.

*OZEK, O. (1942.) Yogurt patojen bakterileri òldùrùrmù? [**Does yoghurt kill pathogenic bacteria?**]—*Istanbul Seriyati.* **24.** 189–195. [German summary.] [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 4. 36, slightly amended. Signed: ERNEST CASPARI.] **1889**

In 60 purchased samples of yoghurt (soured milk), no *Bacterium coli* or intestinal pathogenic bacteria were found by microcopic examination and culture methods. The pH varied from 4·2 to 5·4. Yoghurt is able to kill *Salmonella typhi* and other *Salmonella*, *Shigella*, and *Brucella* spp. in 2–48 hours at 37°C. and somewhat more slowly at room and icebox temperatures. *Brucella* was most sensitive; *Bact. flexneri* was most resistant. Tubercle bacilli were not killed after one week. The bactericidal action of yoghurt is due to its acidity.

GARRISON, E. R. (1945.) **Sources of *Oospora lactis* on dairy farms.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 388. pp. 15. [Abst. in *Rev. appl. Mycol.* **24.** 426, copied *verbatim*.] **1890**

Sources of the common milk and cream contaminant, *Oospora lactis* on Missouri dairy farms were found to include barn dust (especially that raised by grooming the cows); milk equipment (80·6 per cent. of 36 separators, 76·7 per cent. of 60 milk pails, and 65·2 per cent. of 23 strainers); dry feeds (50 per cent. of 50 concentrate mixtures, 17 per cent. of 188 individual concentrates and 19·9 per cent. of 141 hay samples); silage (especially maize); cow manure (the major source of infection on dairy farms); field and garden soils (28·8 per cent. of 52 and 46·4 per cent. of 28 samples, respectively); and cistern water (29·8 per cent. of 84 samples).

ROEMMELE. (1944.) Fleischvergifter im Ostland? [**Meat poisoning in the Baltic countries.**]—*Z. Fleisch- u. Milchhyg.* **24.** 83–84. **1891**

Until 1942 no cases of meat poisoning in human beings and no cases of enteritis infection in animals which could definitely be traced to salmonella organisms

were recorded in the Baltic countries, even though bacteriological inspections had frequently been undertaken in the large abattoirs. There had never been illness from paratyphoid organisms as a result of eating duck eggs.

In 1942, however, *S. dublin* was isolated at Reval, Estonia, from two silver foxes which had been fed with offal from Võchma, and later *S. enteritidis* was isolated from a bovine. An outbreak of meat poisoning in the army on the north front followed consumption of meat balls; within a fortnight *S. typhi-murium* was isolated in 14 of 670 abattoir cattle. All the cattle came from Lithuania and after several days' transport had been herded together in large numbers. As a result, bacterial examinations were performed regularly on cattle at emergency slaughter at the central abattoir and meat factory in Riga. To the time of writing, meat poisoning organisms had been isolated from only one cow.

R. suggests that the cattle may have been infected from animals in the adjoining Russian territories where salmonella infection is more frequent. The origin of the outbreak among army personnel is not clear.

—S. M. G.

SURGALLA, M., & DACK, G. M. (1945.) **Growth of *Staphylococcus aureus*, *Salmonella enteritidis*, and alpha-type streptococcus experimentally inoculated into canned meat products.**—*Food Res., Ill.* **10.** 108–113. [Abst. in *Bull. Hyg., Lond.* **20.** 632, copied *verbatim*. Signed: W. G. SAVAGE.] **1892**

Food poisoning strains of each of the three organisms were used. For tests on growth and survival, portions of canned meats were removed, inoculated with broth cultures and transferred to test tubes with cotton wool plugs. Canned roast beef, corned beef and potted meat, and corned beef and roast beef that had been specially ground before processing were utilized. Tubes were incubated, half at 22°C., the other half at 37°C. Bacterial counts were made at 2, 7, 14, 30 and 60 days interval. The organisms grew well in all three meat products, in general more rapidly at 37°C. Organisms survived for at least 60 days at 22°C. in all cases; also at 37°C., when steps were taken to prevent desiccation. With an initial inoculum of 30 to 5,000 organisms per gramme of meat, counts after 2 days' incubation varied from 10×10^6 to 30×10^6.

The second series of experiments deal with the spread of *Staph. aureus* in sealed tins from a single point of inoculation. The tins were opened under aseptic conditions and special points inoculated with a culture of the organisms, then resealed. Incubated at 22°C. and 37°C. In all the five types of meat used, *viz.* ground corned beef, ground roast beef, potted meat. untreated corned beef and untreated roast beef and whether kept at 22° or 37°C. there was rapid spread of growth through the can. It was most rapid in roast beef, probably because of the greater amount of moisture; growth into solid slabs was slower than through the ground products. No abnormal odours were associated with the meats in any of the experiments.

*VARELA, G., & ZOZAYA, J. (1944.) Hallazgo de Salmonella en alimentos. [**Finding of salmonella organisms in foodstuffs in Mexico.**]—*Rev. Inst. Salubr. Enferm. trop.* **5.** 171–174. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 4. 33, slightly amended.] **1893**

In tests of cattle and hog viscera and also milk samples, 96% of 1,333 samples were found to be contaminated with salmonella.

FRANKLIN, A. V. (1945.) **Achievements of the Army Veterinary Services during the war.**—*Vet. Rec.* **57.** 540–542. **1894**

During 1939–45 the R.A.V.C. was brought up to the strength required by the appointment of young graduates offered emergency commissions rather than by the call up of Reserve officers: the severe nature of active service conditions in Burma proved the wisdom of this policy. Other ranks were recruited from racing, breeding and training establishments, with a number of veterinary students as dressers and dispensers. At the termination of hostilities in 1945 there were 447 officers as compared to the 1,200 officers employed during the war of 1914–18.

The formation of the Cavalry Division in 1939 and the fusion of the Veterinary and Remount Services in 1941 did much to revive the demand for veterinary officers. In 1942 the control of meat supplies and their inspection both *ante* and *post mortem* were taken over by the R.A.V.C., thus increasing the personnel required in the model abattoirs and livestock depots established in the Levant. The year 1943 marked the use of the Corps on active operations in Italy. The great use in Italy of pack animals for the transport of supplies led to the formation of fresh veterinary and remount units to maintain the pack transport units; this demand continued to the end of the war.

Many animals were supplied to partisan units undergoing training under British officers before taking part in operations with the National Liberation Army under Marshal Tito in Yugoslavia.

Dogs were used in all theatres of war for guarding stores and detecting land-mines. Inoculation against distemper was carried out on a large scale, while in the Middle East prophylactic inoculation against rabies was carried out with considerable success. A quarantine station was established in Great Britain for dogs brought by troops from overseas, with a sliding scale of fees adjusted according to the means of the owner.

In the Far East a large proportion of senior administrative veterinary officers and veterinary officers commanding units were supplied by the R.A.V.C., with all other officers and most of the men from the Indian A.V.C. In the Burma campaign pack transport was used to an even greater extent than in Italy and more and more of the newly appointed veterinary officers were sent to this area after a course of training at the Officers' Training School in India. Amongst other important duties of the veterinary services in India were those associated with disease control in the large military stock and dairy and other farms providing meat and dairy produce for the troops.

In the Middle East the disease conditions dealt with included a few cases of glanders quickly controlled by a stringent system of mallein testing, particularly in remount depots, and a few cases of epizootic lymphangitis controlled by the slaughter of infected animals and the isolation of contacts. Acaprin was used successfully in the treatment of piroplasmosis. Mange was mainly of the psoroptic variety. Prophylactic vaccine was used successfully to control an outbreak of African horse sickness in Palestine and Egypt during 1944. It was considered possible that virus-infected insects had been conveyed by aircraft to Palestine.

In India the diseases affecting the stock and poultry farms included rinderpest, anthrax, foot and mouth disease and caprine contagious pleuro-pneumonia. Poultry diseases of most importance were salmonellosis and Newcastle disease, affecting ducks and poultry.

In Burma, surra, epizootic lymphangitis and anthrax were most important. Surra was controlled by the use of mobile diagnostic units and by intravenous injections of antrypol [Suramin B.P.]. The 17% infection rate of 1942 was reduced to 2% in 1944. Anthrax was controlled by the half-yearly use of spore vaccine. Epiz-

ootic lymphangitis is indigenous and gave much trouble under the hard service conditions.

In Italy tetanus was common, and all British Army equines were protected by the use of tetanus toxoid.

Veterinary units were responsible in all theatres of war for salvaging animals left behind by the retreating enemy, the importance of this task being shown by the total of one and a quarter million equines on the German army's establishment.

With the conclusion of hostilities a veterinary organization was attached to the Control Commission for Germany with a similar organization in Austria to co-ordinate veterinary services in the British zones of those countries.—J. A. GRIFFITHS.

See also absts. **1716** (actinobacillosis and meat inspection), **1731, 1732** (leptospirosis).

TECHNIQUE AND APPARATUS

HENRY, R. J., & HENRY, J. E. (1945.) **A turbidimetric method of following cell multiplication within Warburg flasks.**—*J. Bact.* **50.** 31–38. **1895**

A special Warburg flask is described in which the single side arm is replaced by a short length of glass tubing sealed at the end. Turbidity is measured directly through this side arm by means of a photocell unit, so that multiplication of cells such as bacteria and yeast can be followed simultaneously with respiratory measurements in a single manometer; the necessity of employing a series of replicate manometers, each of which has to be dismantled in order to obtain a series of points on a growth curve, is thus avoided.

Statistical analysis of experiments shows the method to be at least as accurate as that involving replicates. —H. SCOTT MCTAGGART.

ANON. (1945.) **The demonstration of tubercle bacilli in infected material.**—*Mon. Bull. Min. Hlth Emerg. publ. Hlth Lab. Serv.* **4.** 202–210. **1896**

Microscopic examination of sputum is usually adequate for diagnosis of pulmonary TB. except in early infection or with disseminated fibrotic lesions, when diagnosis by examination of pooled concentrated specimens or by animal inoculation is necessary. If sputum is unobtainable a culture of laryngeal swabs or stomach contents can be made. Methods of concentration for microscopic examination usually depend on the use of alkalies but are not particularly recommended because of the difficulty of the manipulations, the possibility of spreading infection and the ease with which acid-fast saprophytes are introduced. For culture, however, preliminary treatment of sputum is required. Alkali is often used but is inferior to acid, 3% v/v sulphuric acid being recommended. As media, Dorset's egg and Jensen's modification of Loewenstein's medium are best. For animal inoculation similar preliminary treatment is necessary. With bovine type infections animal inoculation gives rather better results than culture.

In pleural effusions tubercle bacilli are generally scanty. Samples should be cultured without preliminary treatment, microscopic examination being of little value unless with frankly purulent material.

Tubercle bacilli usually occur in urine intermittently and a 24-hour sample should be obtained, centrifuged and examined microscopically or inoculated direct on to egg medium.

For faeces, direct microscopic examination is of little value especially as acid-fast saprophytes are usually numerous. Treatment with 4% caustic soda, incubation, and neutralization with 8% hydrochloric acid is advocated as a preliminary to centrifuging and culturing the deposit.

Pus from suspected tuberculous lesions usually contains very few organisms. If microscopically negative, it should be cultured. Cultures should always be made on plain as well as on glycerated egg medium as many "surgical" infections are due to bovine type bacilli.—D. D. OGILVIE.

RODRIGUES, C., & GUIDA, V. O. (1944.) Substratos apropriados para o transplante de anaerobios, diretamente de colonias desenvolvidas na superficie de placas. [**Adequate substrates for the transfer of anaerobes directly from colonies developing on the agar blood surface.**]—*Arq. Inst. biol., S. Paulo.* **15.** 43–57. [English summary.] **1897**

Of several media tested, the most favourable were the "viscoso", a modification of the medium described by SCOTT [(1926) *J. infect. Dis.* **38.** 511], and the "V.F.", consisting of equal parts of lean ox meat and ox liver.

VAN DEN BERGHE, L. (1943.) La trypanosomose de poussins éclos après inoculation chorio-allantoïdienne. [**Cultivation of *Trypanosoma evansi* in the developing chick.**]—*Ann. Soc. belge Méd. trop., Bruxelles.* **33.** 113–139. [Dutch summary.] **1898**

The successful cultivation of two strains of *Trypanosoma evansi* in the chick embryo is described. Embryos 8–14 days old were susceptible, trypanosomes being present in the blood four days after inoculation and increasing in numbers up to the seventh day.

Death usually occurred after 8–9 days. In a small number of cases infected chicks were hatched alive.

The literature on the use of the chick embryo for cultivation of organisms, especially protozoan organisms, is reviewed.—M. C.

RODHAIN, J., & VAN DEN BERGHE, L. (1943.) Inoculations de spirochètes et de protozoaires sur membrane chorio-allantoïdienne de poulet. [**Cultivation of some species of spirochaetes and protozoan organisms in the chick embryo.**]—*Ann. Soc. belge Méd. trop., Bruxelles.* **33.** 141–156. [Dutch summary.] **1899**

The successful cultivation is described of a number of species of spirochaetes and protozoan organisms, including *Trichomonas foetus, Leishmania infantum* [*donovani*], *Trypanosoma brucei, T. evansi* and *T. gambiense.*

Attempts to cultivate *T. congolense, T. pipistrelli, T. vespertiliones,* and *Plasmodium gallinaceum* were not successful.—M. C.

SCHMID, F. (1942.) Arbeitsgang zum Nachweis von Trichinen mit Hilfe der künstlichen Verdauung. [**Use of artificial digestion for the demonstration of trichinosis.**]—*Z. Fleisch- u. Milchhyg.* **53.** 37–38. **1900**

S. outlines the technique of diagnosis of trichinosis by pepsin-HCl digestion. The paper contains nothing new.—R. A. ROPER.

RAPER, A. B. (1944.) **Notes on the use of Field's stain.**—*E. Afr. med. J.* **21.** 57–60. **1901**

Some hints are given as to the use of Field's stain. Brilliance of staining can best be assured by keeping the stain free from contamination (by storing in a stoppered jar and by the addition of a few drops of chloroform each week), by using freshly dried blood films and by care in making the smear. In addition to malarial parasites, Field's stain is satisfactory for trypanosomes, microfilariae and treponemata.—D. D. OGILVIE.

ADAMS, J. M. (1944.) **An investigation of the haematocrit and a suggested method for the standardization of haematocrit readings.**—*Med. J. Aust.* Dec. 16th. 636–641. **1902**

This is a description of the errors likely to occur in haematocrit readings as a result of the type of anticoagulant used, the method of collection of blood samples, variations in temperature, the type of centrifuge and haematocrit tubes used and the use of different types of blood with different viscosities. From investigations into the effects of these figures on haematocrit readings in man, A. recommends the use of a standard centrifugal force or a suitable correction for the force used. Graphs are provided for the correction of the centrifugal force, the viscosity of the blood and the anticoagulant.—D. C. BLOOD.

BERG, W. N. (1945.) **Blood cell counts. Their statistical interpretation.**—*Amer. Rev. Tuberc.* **52.** 179–220. [Spanish summary.] **1903**

This extensive paper on the statistical aspects of blood counts contains a great deal of detail not easily summarized. The following problems are considered :– the distribution of red cell counts, the information obtainable from a single red cell count, methods of determining whether a single chamber count is correct, how large a difference between two counts may be due to random sampling and whether two counts are better than one. Similar problems are treated for total white cell and neutrophile counts. Lymphocyte counts and monocyte counts are also considered and special methods are indicated for use when counts are less than 5%. Numerous tables are included, the use of which enables the worker to make his own tests of the significance of blood cell counts.—T. E. GIBSON.

TURKEL, H., & BETHELL, F. H. (1944.) **A new and simple instrument for administration of fluids through bone marrow.**—*War Med., Chicago.* **5.** 222–225. [Abst. in *Bull. War Med.* **5.** 253, copied *verbatim.* Signed : John F. LOUTIT.] **1904**

With the instrument described, it is claimed that the following undesirable complications of sternal transfusion are avoided : penetration of the needle into the mediastinum by the use of uncontrollable force, breaking of the anterior lamella of the sternum into small particles which obstruct the lumen of the needle and induce clot formation, and accidental dislodgement of the needle while the infusion is in progress.

The instrument consists of two needles with stylets, an outer guiding needle of 14 gauge and an inner trephine needle of 17 gauge. The purpose of the outer guiding needle is to cut through the skin and subcutaneous tissue without excising them, until the point rests on the periosteum. The stylet is then replaced by the inner trephine needle, which drills a hole through the anterior lamella, and retains the entire core, instead of breaking it up into particles. The outer needle is then pushed a distance of 6 mm. into the prepared hole, with little force. The inner needle is removed and, after the presence of the tip of the outer needle in the sternal cavity has been verified by aspiration with a syringe, the instrument is ready for the infusion.

DICK, A. T. (1944.) **Aspiration biopsy of the liver in sheep.**—*Aust. vet. J.* **20.** 298–303. **1905**

A method for collecting samples of liver tissue in the live sheep is described. Puncture of an anaesthetized portion of the chest wall is performed with a sharp "scalpel" of triangular section ; a long trocar is then pushed into the liver and a core of tissue is withdrawn. A syringe attached to the free end ensures that the specimen remains in the trocar. Samples collected are suitable for biochemical or histological examination and the operation may be repeated at short intervals on the same animal without untoward effects. The avoidance of the effects of a general anaesthetic on the liver metabolism is an added advantage.—D. C. BLOOD.

BAUMANN, E. (1944.) Sterilization und sterile Aufbewahrung von Spritzen und Hohlnadeln. [**The sterilization and sterile preservation of syringes and needles.**]—*Schweiz. med. Wschr.* **74.** 1115–1133. [Abst. in *Bull. Hyg., Lond.* **20**, 633, copied *verbatim.* Signed : L. P. GARROD.] **1906**

This article is the Report of a Commission established by the Union of Swiss Physicians, which has apparently been at work for several years, receiving support from various medical societies, obtaining evidence from them and from many individuals and commercial firms, and undertaking original experimental work. The object of its establishment was to define methods by which infections due to imperfect sterilization of syringes and needles can be prevented, bearing particularly in mind the severe practical difficulties which a high standard of sterility imposes, particularly on the general practitioner. As one member of the Commission remarked : "It is difficult to picture a doctor carrying an autoclave round with him". The report is of great length and somewhat repetitive and discursive ; its 28 sections cover almost every aspect of the subject, including apart from precautions of all kinds in connexion with the use of syringes, the sterilization of surgical instruments and paraphernalia generally, legal responsibility for septic accidents, war-time difficulties of supply, and the advantages of "Tubunic" ampoules, particularly to mountaineers.

The main conclusions may be summarized as follows. Separate syringes must be kept for injecting sterile medicaments and for aspirating possibly septic material. Different sterilizing methods are advocated according to whether a syringe has been used for an aseptic purpose or for one which may have contaminated it with pathogenic bacteria ; the processes concerned are referred to as "disinfection" (treatment which will destroy common pathogenic bacteria) and "sterilization" (treatment which will destroy any bacteria whatever, highly resistant spores included). Methods recommended for disinfection are boiling in water, dry heat not pushed to the point of turning cotton wool packing brown, and immersion in the cold in one of 3 solutions : these consist of 5 per cent. formalin in 70 per cent. alcohol, 5 per cent. "Desogen" (a quaternary ammonium compound) and 1 per cent. sodium nitrite, and a solution containing 2·5 per cent. formalin, 0·5 per cent. phenol, and 1·5 per cent. sodium biborate. Glycerin (1·5 per cent.) may be added to any of these and is said to improve their disinfecting power and prevent jamming of pistons. Sterilization, on the other hand, demands either autoclaving, boiling in a closed vessel under a pressure of 1 atmosphere dry heat carried to the point of browning cotton wool, or boiling in either 2 per cent. sodium carbonate (with or without the addition of 0·1 per cent. formalin to reinforce disinfectant action, or of 0·1 per cent. sodium nitrite to prevent rusting), or 2 per cent. "Desogen". It is said that traces of these and the foregoing solutions will do no harm to drugs [their possible effect on immunizing agents, and on the constituents of blood withdrawn for serological tests, does not appear to have been considered].

For much other practical information the original report must be consulted. Two further points of outstanding interest are that the use of alcohol is condemned and that no preference is expressed for all-glass syringes ; glass-metal syringes are obtainable in Switzerland marked "200°C.", the cement of which does not melt below this temperature.

LEHR, D. (1945.) **Stomach-tube feeding of small laboratory animals. A simple "hairpin" gag insuring safe and rapid intubations by a single person.**—*J. Lab. clin. Med.* **30.** 977–980. **1907**

A gag is described which consists of a piece of strong wire shaped in the form of a hairpin, the ends of which are attached to a short metal bar. A metal rod attached to the other side of the bar allows the instrument to be attached to a standard laboratory support. A similar gag may be improvised by forcing the ends of a strong hairpin into a cork stopper held in a clamp. Rats may be suitably immobilized by wrapping in a small towel, leaving the head free. The animal is held by the back of the head, the jaws are made to slide sideways over the end of the hairpin and the stomach-tube is inserted with the other hand.—H. S. MCTAGGART.

WATSON, R. H., & JARRETT, I. G. (1945.) **Intubation of the abomasum in sheep.**—*Aust. vet. J.* **21.** 8–10. **1908**

A technique is described for the introduction of a rubber tube, ¼ in. or less in external diameter, into the abomasum *via* the nasal route; the method was successful in only a small proportion of sheep, in which it became less successful with repeated attempts. The sheep in which the technique was successful were animals which in previous experiments had swallowed barium sulphate in water suspension into the abomasum with great regularity.

It was found that when the tube had been inserted for approximately 24 in. the tip was 1–6 in. from the cardiac orifice. At this stage water was administered by mouth and the tube pushed on as the animal swallowed. The destination of the tube was determined by means of X-rays.

The position of the tube in different compartments of the stomach systems is illustrated in drawings. A headgearused in this work is also illustrated.—H. McL.G.

JOHNSTONE, I. L. (1944.) **The tailing of lambs: the relative importance of normal station procedures.**—*Aust. vet. J.* **20.** 286–291. **1909**

Observations were made on the rapidity of healing following various modifications in the methods of removing the tail, including cutting through a joint instead of through a coccygeal bone, leaving a ventral flap of skin, cutting the tail at different lengths, performing the operation at different ages, leaving an excess or deficiency of skin on the tail-stump and bending the tail or holding it straight while cutting; the influence on healing of gross infection was also studied.

Among anatomical studies were those of the fate of the vertebral remnant, the level to which muscle tissue extends along the tail, the subsequent conformation of the tail stump, the position of the scar, the degree of pucker caused by scar tissue, and "dimple" formation.

J. concludes that the longer the tail is left at docking the more rapidly the wound heals; that whether the joint or the bone is cut has no influence on healing, that the younger the lamb, the more rapid the healing, and that healing is more rapid when an excess of skin is left to cover the stump. Gross infection retards healing and is seen most frequently in tails docked to leave "short" and "medium" length stumps. If the tail is held straight and the skin on the under surface pushed forward before the tail is docked, the scar forms at the dorsal border of the tail tip, which is left free of wool, a desirable feature from the point of view of tail strike by blowflies. The shorter the tail stump, the more prevalent were undesirable forms of scar formation, including dimpling.

The observations recorded have a general bearing on management and a special bearing on the prevention of fly strike of the tail, both in the newly docked lamb and throughout the life of the sheep.—H. McL. G.

See also absts. **1690** (diagnosis of mastitis), **1693** (of anthrax), **1698, 1703** (of TB.), **1704** (of Johne's disease), **1714** (of ringworm), **1702** (cultivation of tubercle bacilli), **1741, 1742** (purification of influenza virus), **1760** (lyophilization), **1731** (demonstration of leptospira lysins), **1778** (charting and capturing emerging warbles), **1787** (surgery for coenurosis), **1833, 1834** (artificial insemination), **1886** (test for human and cow's milk).

MISCELLANEOUS

PHILLIPS, R. W. (1945.) **Livestock in the lives of the Chinese.**—*Sci. Mon., N.Y.* **60.** [No. 4.] 269–285. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 7. 21, copied *verbatim.*] **1910**

China is roughly divisable into three agricultural areas: a rice region in the south-west, a region of wheat and millet in the middle part of the east, and a region of grazing in the north and west. The first two areas are densely populated and the land is devoted to the raising of human food to a degree which makes the maintenance of animals much less possible than in normal American agriculture. The water buffalo is the chief domestic animal of the rice area; cattle, horses, donkeys and mules are used in the wheat area and the grazing area has abundant horses, cattle, camels, sheep, and yaks. Goats and poultry are present everywhere; pigs are also to be found everywhere except in the north-west Mohammedan area. The breeding and care of animals could be greatly improved by scientific methods. Improved transportation, allowing an interchange of products between grazing and farming regions, as in the U.S.A., would be beneficial.

ABERCROMBIE, M., & JOHNSON, M. L. (1945.) **Premedical zoology.**—*Brit. med. J.* August 25th. 262–263. **1911**

The authors consider that in the current discussions on medical education, the teaching of premedical science has received inadequate attention. A premedical course in zoology should contribute two things to medical education, a training in the scientific attitude and method, in which contemporary courses are seriously deficient, and a knowledge of the biological principles basic to medical science, with factual material chosen wherever possible for its importance to man in society, rather than for its importance in "academic" or "pure" zoology.

The assimilation of facts does not necessarily lead to an understanding of the scientific attitude nor does it develop the qualities of observation and interpretation so essential in the medical graduate. Practical classes should be designed to correct this; in the words of the authors, "it would be far better if students were taught less and found out much more".

While refuting the suggestion that students be given in any sense a preliminary course in medicine, the authors suggest that the main study shall be man in relation to animals, with illustrations drawn for their relevance to medical and social problems. Thus they would substitute a study of the malaria parasite for that of *Monocystis*, a study of the hookworm for that of the tapeworm and so on.

They consider that such a course in "human

zoology" is a good general training for every kind of student, and hence agree with the Goodenough Committee that early segregation of medical and science students is undesirable. They have found that science students find a course with a medical flavour more interesting than the traditional one.

A brief syllabus for such a course is given, with emphasis on the need for the inculcation of clear thinking and initiative.—S. M. G.

—. (1945.) **Teaching and practice of chemical pathology. A memorandum by the chemical pathologists of the London teaching hospitals.**—*Brit. med. J.* July 21st. 93–94. **1912**

The position of chemical pathology in the curriculum of medical education and in the final examination is considered to be unsatisfactory. The Committee of the chemical pathologists of the London teaching hospitals agree with the Goodenough Report that chemical pathology should form a separate department of the division of pathology and should be under the direction of a professor, reader or senior lecturer. They suggest further that the chemical pathologist should be a full member of the medical committee of his hospital. They do not agree with the Report's recommendation that the clinical pathologist should be responsible for the "routine" chemical work of the hospital, for this might mean the chemical pathologist's being deprived of valuable clinical material and losing touch with methods current in practice; the standard of chemical work would be inevitably lowered. There should be a close liaison between the department of chemical pathology and the pre-clinical biochemical department.

Suggestions are made for a curriculum consisting of 24 hours' instruction in chemical pathology during the clinical years and it is recommended that in every examination in pathology, chemical pathology should receive representation equal to that accorded to the other branches of the subject.—E. G. WHITE.

SHEEHAN, J. F., & BRUNER, J. A. (1945.) **The care breeding habits, and vaginal smear cycle of the laboratory hamster (Cricetus auratus).**—*Turtox News.* **23.** No. 4. 65–68. [Abst. in *Biol. Abstr.* Sect. F. **19.** No. 8. 31, slightly amended. Signed: R. W. DEXTER.] **1913**

Information and suggestions are given for the use of this rodent for laboratory purposes. A short gestation period and large litters make it suitable for experimental needs. Stages in the oestrous cycle can be detected by vaginal smears. Tables show development during the first six weeks of growth.

—. (1945.) **Resolutions passed at seventh annual conference of the Dominion Council of Canadian Fur Breeders.**—*Amer. Fur Breed.* **18.** No. 2. 16 & 18. **1914**

A resolution of veterinary interest was that a committee be appointed to interview the Veterinary Director General regarding the control of distemper among ranch-raised fur-bearing animals and, in the absence of a concrete plan of control, to recommend on behalf of the Dominion Council of Canadian Fur Breeders the use of attenuated virus vaccine administered by qualified veterinarians, that the services of Veterinary Inspectors of the Health of Animals Branch be made available to fur breeders in cases of emergency to give vaccine, that, at the request of a Province, control of distemper measures be placed under its jurisdiction and that if there be no facilities in Canada for the preparation of attenuated virus vaccine, the Dominion Government should give financial assistance to enable fur breeders to buy vaccine.

The conference also resolved that the Dominion Department of Agriculture be asked to establish more fur research stations, which might be integrated with existing facilities and be equipped as service stations available to deal with problems of disease and nutrition —J. A. GRIFFITHS.

SAVEL'EV, G. S. (1943.) Rabota po sokhraneniyu skota v khozyaĭstve. **[Preserving the stocks of farm animals.]**—*Veterinariya, Moscow.* No. 10–11. pp. 39–40. **1915**

S. describes an isolation farm for animals infected with brucellosis and TB., containing 872 cattle, 100 pigs and 120 horses. As a result of mismanagement, unhygienic conditions and lack of co-operation between farm "administrators" and veterinarians, the farm was a failure in 1933. The "administrators" were directed to fulfil certain hygienic measures, which are described in detail, and it is stated that during 1936–39 good records were registered.

WARNER, J. N. (1944.) **A suggestion in terminology.** —*Indian Fmg.* **5.** 569–570. **1916**

W. points out that the term "cow" presents a problem in the terminology of the two bovine species, the buffalo and what is ordinarily called the "cow". According to some, the mature female of any species of the genus *Bos* is a cow. To avoid confusion, he suggests use of the terms "zebu cow" for Indian indigenous animals, "taurus cow" for females of foreign breeds and "buffalo" for what is ordinarily understood by *Bos bubalis*.—M. M. HUQ.

REPORTS

NEW ZEALAND. (1945.) **Nineteenth annual report of the Department of Scientific and Industrial Research.** pp. 65. Wellington: Govt. Printer. fcp. Items of veterinary interest, pp. 8–11, 43, 45, 47 & 49–51. **1917**

At the Dairy Research Institute investigations were continued on the subject of feed taint in cream and butter resulting from the ingestion of land cress. The fourth season was concluded in the dairy cow nutrition experiment, in which the production and composition of milk from cows receiving pasture and normal farm supplement were contrasted with that from cows fed meal in addition to the above food. The effect of the animals' diet on the characteristics of the curd during cheese making was also observed. Data are being accumulated from the systematic weighing over a period of years of all available dairy cattle at the Institute. From these data preliminary growth curves were plotted for typical Jersey and Friesian cattle grown under conditions of reasonably good management and feeding. Figures were also obtained on body weight variations of mature animals throughout lactation and under varying nutritional influences. Since 1943 experiments have been in progress to determine whether, with our present knowledge of the physiology of milk secretion, it was practical to increase milk and fat production by using the commercially available hormones or their equivalents. Work has been confined to experiments on the initiation of lactation with diethylstilboestrol in cases of temporary or permanent sterility and to the production of iodinated protein having thyroid activity, and the testing of its effects on milk production and composition.

Experiments were initiated to determine the effect of irrigation with bacteriophage in the treatment of cows with STAPHYLOCOCCAL MASTITIS. Results are as

yet inconclusive. In collaboration with the Wallaceville Animal Research Station investigations were also conducted on the use of acriflavine and tyrothricin as udder irrigants in the treatment of this disease.

Experiments to determine the optimum quantity of cobalt sulphate applied as a topdressing to maintain stock health in cobalt-deficient country indicated that while applications of both 4 oz. and 8 oz. per acre were beneficial, the latter gave the better result, its effect persisting 18 months.

In the sheep-dipping experiments, the effect of derris suspensions on body lice (*Bovicola ovis*) was the subject of the main trials. The effect of combination of bentonite-sulphur in a wide range of concentrations with derris to prevent reinfestation with *Melophagus ovinus* (sheep ked) was also observed in other trials.

At Lincoln College, the subjects investigated in the animal production field included progeny testing of Southdown rams, teeth studies in sheep, the establishment of a pure inbred strain of Romney sheep, pig-breeding, and forage crops for lamb-fattening.

At Massey College progeny testing for improved mutton and wool production in Romney sheep was continued and experiments were carried out to determine the effect of age on the milk supply of the Romney ewe and its relation to the growth of the lamb. Investigations were also initiated to determine the factors responsible for deterioration of teeth of Romney breeding ewes in the Taihape district.

The investigations in sheep parasitology were directed towards the evaluation of the significance of the various environmental factors in the epidemiology of *Haemonchus* infection. Steps were made to determine the influence of age in the process of acquisition of infection, to distinguish its significance from that of resistance acquired as the result of previous infection, and to assess the influence of seasonal differences in exposure to infection.

Experimental breeding and other research has been continued on sheep with very kempy birthcoats, and very hairy fleeces.—M. B. BUDDLE.

NORTHERN RHODESIA. (1944.) **Progress report of the Game and Tsetse Control Department to 31st December, 1943.** [JONES, T. V.] pp. 8. Chilanga: Game & Tsetse Control Department. fcp. **1918**

The basic functions of the game and tsetse control department of Northern Rhodesia, which was created in 1940, include the control and preservation of game, tsetse control, wild fauna economics, publicity, and collaboration with research institutes. Its work is closely co-ordinated with that of the health, veterinary and agricultural authorities.

An account is given of the methods adopted for the control of elephants and buffaloes, and of the measures taken to prevent the spread by game movements of RINDERPEST from Tanganyika to Rhodesia; these include the construction of fences and intensive shooting in the threatened area.

The only species of tsetse fly considered to be of economic importance is *Glossina morsitans*. It is suggested that in addition to seasonal cycles of movement by these flies there is a biological cycle, which may be called the "period-cycle". Indications are that the "period-cycle" of *G. morsitans* has been on the upgrade since the early days of the century, and that there is a tendency to extension wherever there is a weak spot in the checks. It is thought that the best long-range policy will be an adaptation of the Southern Rhodesian principles of progressive game extermination with a fencing off of agricultural and pastoral blocks. —U. F. RICHARDSON.

NIGERIA. (1945.) **Annual report of the Veterinary Department for the year 1943.** [HENDERSON, W. W.] pp. 25. Lagos: Govt. Printer; London: Crown Agents for the Colonies. 8vo. 1s. **1919**

The main report of the Director of Veterinary Services is supplemented by three appendices containing an abridged report of the Veterinary Pathologist [R. W. M. METTAM], the report of the acting Principal of the Veterinary School [R. S. MARSHALL] and a report on RINDERPEST immunization by means of goat virus.

The main activities of the department were directed towards the control of ANTHRAX, HAEMORRHAGIC SEPTICAEMIA, BLACKLEG, RINDERPEST, and BOVINE CONTAGIOUS PLEURO-PNEUMONIA. The vaccination of trade cattle against ANTHRAX was satisfactory and mass vaccinations against BLACKLEG gave spectacular results. Large-scale treatment with tartar emetic was used for BOVINE TRYPANOSOMIASIS, and the provision of artificial water supplies is recommended, as clearing of rivers is not considered practicable. TRYPANOSOMIASIS also caused losses among horses. RABIES is never absent from Nigeria, and in some districts energetic measures have been taken to destroy stray dogs. Vaccination against BOVINE CONTAGIOUS PLEURO-PNEUMONIA was not satisfactory, but better results are expected from a method using three vaccines of increasing potency. The existence of a negative phase after vaccination and the necessity of avoiding immediate exposure to infection are emphasized. A vaccine is on trial for CAPRINE CONTAGIOUS PLEURO-PNEUMONIA; the damage to skins from GOAT POX is emphasized. An outbreak of SOUTH AFRICAN HORSE SICKNESS has been recorded. Sulphapyridine is said to be effective in the treatment of EPIZOOTIC LYMPHANGITIS, but too expensive. Owing to the nomadic habits of the natives immunization was adopted for the control of RINDERPEST, the use of goat virus largely replacing that of bovine virus. 553,000 cattle were immunized either by serum-virus or attenuated virus alone and 115,600 were vaccinated with formolized spleen pulp.

BLUE TONGUE has been recorded in sheep, but its prevalence has not yet been ascertained.

Animal clinics have been established in all the northern provinces, and treatment is provided free to Africans for all animals from fowls to camels. Progress continued in the organization of the meat, milk, butter and hide trades; a start has been made in the manufacture of cheese and pig-keeping is becoming an important industry, no serious diseases having been recorded in these animals. The research division, in addition to its work on examination of specimens and vaccine production, records investigations into calf mortality and into the life-cycle and pathogenic importance of *Bunostomum phlebotomum*.

Veterinary education began to assume material form in 1943, but the acting Principal reports that it will be some time before the organization of the school nears completion.

The appendix on the use of goat virus for RINDERPEST stresses that the goats used must be susceptible to rinderpest (this is indicated by a rise in temperature to 105°F., or higher, on the third day following inoculation) and that their blood when inoculated into cattle must cause a rise of temperature reaching 104°F. on the fourth day. The danger of using goat blood is that the virus may lose its potency, and not have sufficient antigenic power to set up immunity. Dried goat spleen virus has to be made at the laboratory and can be tested before issue, but requires refrigeration for storage and transport. The virus survives for months in tubes kept below −4°C. In both cases great care must be taken that a bovine strain of virus is not introduced. The

resultant immunity was satisfactory for as long as observed (four years).—U. F. RICHARDSON.

I. UGANDA PROTECTORATE. (1945.) **Annual report of the Veterinary Department for the year ended December 31st, 1944.** [MACKINTOSH, W. L. S.] pp. 12. Entebbe : Govt. Printer. 8vo. Sh. 1/–. **1920**

II. UGANDA PROTECTORATE. (1945.) **Veterinary Laboratory, Entebbe. Annual report 1944.** [BELL, F. R.]—*Rep. vet. Dep. Uganda*, 1944. pp. 6–12. **1921**

I. The wartime stimulation of cattle trading reduced the tendency to overstock grazing areas to such an extent that control of export had to be introduced to prevent overselling, and an increasing demand for milk for townships, and for ghee-making, produced a tendency to underfeed calves. A satisfactory increase occurred in grade I ghee production. A comparatively new pig industry developed rapidly and Large White boars were imported.

Tsetse-infested areas have been expanding and in some areas stock is being rapidly decimated, 11,000 head being lost in one locality, and an important stock trade route closed. Assistance in the problem of tsetse control has been given by the Tsetse Research Department of Tanganyika [see absts. 1780-1781]. TRYPANOSOMIASIS also increased in tsetse-free areas, difficulty in diagnosis preventing effective control, and no suitable drug for treatment being available. Stibophen and phenanthridinium [presumably phenanthridinium S.897] proved unsuitable. RABIES was prevalent in the West Nile district, being dealt with by the destruction of all dogs in certain parts of the district.

RINDERPEST prevalence in game necessitated the immunization of 447,770 cattle, goat virus being used. This proved satisfactory for zebu cattle, but for Ankole long-horns further attenuation was required.

II. Investigations into the chemotherapy of BOVINE TRYPANOSOMIASIS revealed that pentamidine did not protect cattle from *T. congolense* infection for a sufficient time to have any value and that stibophen in single doses could not be relied on as a curative.

Work on glucose tolerance in bovines showed that animals in which hyperglycaemia had been induced by intravenous injection could be restored to normal within two hours ; renal threshold determinations showed an ascending blood sugar mean of 98 mg. per 100 ml. and a descending mean of 102 mg. per 100 ml.

Observations are recorded on renal calculi in adult cattle, aortic lesions caused by *Onchocerca armillata*, milk yields of native and cross-bred cows, the age of puberty, and the relation of girth measurement to weight, the last differing considerably from the relationship determined for Gold Coast cattle. Work on age estimation revealed that Uganda cattle erupt their permanent incisor teeth about one year later than *Bos taurus* kept under European conditions.

Tests of the value of the feeding of cottonseed as a supplement to pasture indicated that it had a value, but that this was greatest when the animals were already on good pasture.—U. F. RICHARDSON.

CEYLON. (1945.) **[Report on] Veterinary and Animal Husbandry [for the year 1943].**—*Rep. Acting Dir. Agric. Ceylon, 1943.* pp. 10–14. **1922**

A table is given of the stock diseases recorded during the year, including TUBERCULOSIS, HAEMORRHAGIC SEPTICAEMIA, FOOT AND MOUTH DISEASE, RABIES, GOAT POX, SURRA and MANGE.

RINDERPEST broke out in January in Colombo, the infection being ascribed to the importation of goats and sheep from India, and the relaxation owing to war conditions of the regulation requiring slaughter of imported animals at the port of entry. This outbreak spread to other districts, and an independent outbreak occurred near Trincomalee in the neighbourhood of a goat and sheep distribution centre. Outbreaks were treated by the slaughter of affected animals and the use of serum and spleen vaccine. The formolized spleen vaccine gave fairly satisfactory results, most of the failures occurring in dairy cattle of European breed. Most of the vaccine was prepared from buffalo spleen, but field evidence suggested that results were best when vaccine made from buffalo spleen was used on buffaloes, and vaccine made from cattle spleen on cattle. 2,606 deaths occurred during the year and 763 animals were destroyed, but the disease still existed in four areas at the end of the year.

336 cattle were imported from Australia during the year, but the Department of Agriculture was given insufficient time to arrange for their reception, with the result that there was a heavy mortality from ANAPLASMOSIS, PIROPLASMOSIS, THEILERIASIS and calving troubles.

Research activities had largely to be abandoned to allow the research staff to undertake the manufacture of rinderpest vaccine and sera.—U. F. RICHARDSON.

U.S.A. (1943.) **Report of the Administrator of Agricultural Research, 1943.** pp. 236. Washington, D.C. : U.S. Govt. Printing Off. 8vo. **1923**

The Agricultural Research Administration was created in December, 1941, the following agencies being thus combined under one administrative head : the Bureaux of Animal Industry, Agricultural and Industrial Chemistry, Dairy Industry, Entomology and Plant Quarantine, Human Nutrition and Home Economics, Plant Industry, Soils, and Agricultural Engineering, the Office of Experiment Stations and the Beltsville Research Centre. Many of the research projects of the organization are carried out at the Beltsville Research Centre and in addition there are 13 regional laboratories, all but one of which are administered by one or other of the Bureaux included in the Agricultural Research Administration.

The Plant, Soils and Nutrition Laboratory at Cornell University is under the direct supervision of the Agricultural Research Administrator and its work is reported separately. The sections of its work of interest to the veterinarian concern the study of soil and pasture and forage mineral deficiencies and their effect on stock. Cobalt, manganese and iron deficiencies were specially studied. It was found that leafy vegetables contain most cobalt and that different species of leafy plants vary in their cobalt content, although grown under the same conditions, and that the same species may vary in cobalt content when grown in different localities. Studies have also been made on the anaemias caused by copper and iron deficiencies in rats ; it was found that deficiency of iron produced an anaemia of the hypochromic, microcytic type, whilst copper deficiency produced hypochromic, normocytic anaemia.

The rest of the first section of the report deals with the changes in organization during the year and lists the outstanding achievements of the year's work. The remainder of the report consists of the combined reports of the Chiefs of the following Bureaux : Agricultural and Industrial Chemistry, Animal Industry, Dairy Husbandry, Entomology and Plant Quarantine, Human Nutrition and Home Economics, Plant Industry, Soils, and Agricultural Engineering and of the Chief of the Office of Experiment Stations.

The only item of interest to the veterinarian in the Report of the Chief of the Bureau of Agricultural and Industrial Chemistry is an account of investigations on the production of penicillin, as a result of which greater yields of purer penicillin have been achieved. The

Reports of the Chiefs of the Bureaux of Dairy Husbandry, Animal Industry, Entomology and Plant Quarantine are abstracted separately [see respectively *V. B.* **15.** 249, **14.** 439 & **16.** 306]. The Reports of the Chiefs of the Bureaux of Human Nutrition and Home Economics, Plant Industry, Soils and Agricultural Engineering contain no important items of direct interest to the veterinarian.—T. E. GIBSON.

Extracts from annual reports of Agricultural Experiment Stations, U.S.A. [The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published, abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of titles of these reports and of relevant papers contained in them will be found in the *Index Veterinarius*.] 1924

FLORIDA, 1938–39.—The diseases diagnosed in the Veterinary Laboratory are listed, ICTEROHAEMOGLOBINURIA (RED WATER DISEASE) being observed in Florida for the first time. The calcium requirements of cattle and the effects of cobalt- and copper-deficient diets, as well as the effects of an excess of molybdenum given to cattle on a copper-deficient diet were studied. The role of tissue autolysis in the aetiology of FOWL PARALYSIS was investigated, and PARALYSIS in cattle thought to be due to PLANT POISONING has been studied. Experiments on ENZOOTIC BRONCHO-PNEUMONIA (PNEUMO-ENTERITIS) of dairy calves revealed that *Pasteurella boviseptica* was not a primary aetiological agent in this disease.

FLORIDA, 1940–41.—Studies were made on the effect on beef cattle of cobalt and copper deficiencies produced by certain diets. Aluminium salts were found to be beneficial in certain arthritic conditions of cattle. The calcium and phosphorus supply in the diet of dairy cattle was studied. Four fractions significant in the mechanism of tissue autolysis and LEUCAEMIA have been isolated from chicken livers. POISONING in cattle due to ingestion of the plant *Crotalaria spectabilis* has been investigated. Trials on peanuts as feed for pigs were continued. Reduction of LOUSE INFESTATION was seen in chickens fed 5% sulphur in the mash but not in those fed a similar amount of sulphur in capsules. It has been found possible to control internal PARASITISM of sheep by the adoption of a system of pasture rotation. *Musca domestica* and *Hippelates* spp. have been found capable of transmitting BOVINE MASTITIS organisms mechanically from infected to healthy udders. Injection *via* the teat canal of a 1 : 1,000 solution of resublimed iodine crystals in U.S.P. liquid petrolatum has been found useful in the treatment of chronic udder infections in cattle. Breeding efficiency was studied in ten dairy herds. It was found that native cattle withstood heat and humidity better than Red Poll or Red Poll-Red Danish cross breeds.

FLORIDA, 1942–43.—Field surveys were made in areas where mineral deficiency occurred. The relation of mineral consumption to reproduction in dairy cattle was studied. Work on HAEMOCYTOBLASTOSIS in chickens continued. POISONING due to the plant *Lantana camara* was observed in bulls. Phenothiazine given in capsules or as a 1 : 10 mixture in the feed, together with pasture rotation successfully controlled internal parasites in sheep. Intramammary injections of sulphanilamide were found to be effective in the treatment of STREPTOCOCCAL MASTITIS. Further work has shown the necessity of feeding mineral supplements when fattening pigs on peanuts. Soil and plant samples were collected and were being analysed in connexion with the study of the mineral requirements of cattle. The effect on cattle of grazing on pastures improved by the use of fertilizers is being studied.

KENTUCKY, 1943.—*Salmonella abortus-equi* vaccine was used to immunize 1,498 mares and reports indicate that the vaccine was fully effective. BOVINE PARASITISM was found to be the cause of losses in 20% of all herds studied. *Ostertagia ostertagi* was mostly responsible for the losses in winter and early spring whilst losses from *Haemonchus contortus* infestation occurred during July and August. Cases of BOTULISM were seen in eight herds of pigs, deaths resulting in some cases ; the source of the toxin was kitchen waste containing spoiled canned food. MALNUTRITION was found to be the cause of disease in 40 herds out of 258 studied. Breeding records of the Experiment Station herd kept over 26 years show that cattle with the highest breeding efficiency also produce most butter fat. Losses from PARASITISM occur in ewes in the late winter being due to parasites acquired the previous autumn, and to malnutrition ; prevention is by anthelmintic treatment in the autumn and adequate feeding during the winter. Fused rock phosphate containing up to 0·3% of fluorine may be fed to chicks in amounts up to 3% of the total ration but rock phosphate containing 3·42% of fluorine decreased food consumption and retarded growth when fed at the same rate. Vegetable protein proved as effective as animal protein for feeding growing pullets.

KENTUCKY, 1944.—Pastures kept free from sheep during July, August and September became almost free from *Haemonchus contortus* larvae capable of establishing themselves in lambs. INTERNAL PARASITISM is the major source of trouble to sheep farmers, MALNUTRITION and sporadic PNEUMONIAS also being important. SWINE FEVER, NUTRITIONAL DISORDERS and PARASITISM were the major sources of loss amongst pigs. Studies on egg production, fertility and hatchability showed that the use of aged hens with good egg production, fertility and hatchability records is desirable in a constructive breeding programme but that pullets are best used on a general farm maintained for egg production. Chicks given 1·5–2·0% solutions of sodium chloride instead of drinking water had toxic symptoms in two days and were dead in four. Chicks given 0·90 and 0·50% solutions had symptoms on the fourth or fifth day and the death rate was high up to the 14th day. No symptoms except thirst were noted in chicks receiving 0·25% solution. In observations on the louse populations of poultry, White Leghorns appeared to be more susceptible to lice than the coloured breeds. In a study of the palatability of phosphorus supplements for cattle, supplements were used containing bonemeal 83%, fused rock phosphate 16% and dicalcium phosphate 0·8%. In seven herds containing 318 cows examination of milk samples showed that *Streptococcus agalactiae* infection predominated in three and *Str. uberis* in four. In one herd only *Str. uberis* was found, but both were found in the other herds. Vaccines have been prepared for use against *Salmonella abortus-equi* infection and EQUINE VIRUS ABORTION. Attempts to transmit PERIODIC OPHTHALMIA by contact exposure and intrapalpebral injections of vitreous humour, aqueous humour and a filtrate of ground uvea from an acute case were unsuccessful. The strains of *Salmonella* isolated during the year are listed. The role of arsenic and boron in the nutrition of rats has been studied. The claim that g. pigs can synthesize ascorbic acid from injected mannose if a manganese salt is injected simultaneously was not supported by tests carried out during the year.

LOUISIANA, 1942–43.—When fed at the rate of 1·65 g. per 50 kg. body weight to cattle, iodinated casein caused an increased milk yield and percentage of butter fat but also caused an acceleration of the pulse rate and loss in body weight. No significant effect on temperature

was noted. The administration of sulphur and charcoal in the feed reduced the losses from COCCIDIOSIS in chickens. Body lice in mature hens were controlled by dusting chickens with sulphur or by broadcasting sulphur over the litter at the rate of 2–4 lb. per 100 sq. ft. and by placing a handful in each nest. When strain 19 BRUCELLOSIS vaccine is administered intradermally in 0·2 ml. doses the post-vaccination reaction period is shorter than when 6 ml. are given subcutaneously. Experiments on the immunity of bovines to *Haemonchus contortus* infection showed that diet does not affect the susceptibility to further infection of animals that have an established immunity. Experiments demonstrated that stomach worms do considerable damage and may even cause death during the larval stage.

MARYLAND, 1942–43.—BRUCELLOSIS vaccination with strain 19 is recommended for calves 4–8 months of age. The addition of kelp meal to normal rations for dairy heifers and cows appeared to be of no particular value for improving physical condition or milk production. Holstein and Ayrshire calves 3–14 months of age require 66 μg. of carotene per kg. body weight over the winter season. The addition of riboflavin to the ordinary laying mash of hens increased hatchability. Dried whey, distillers' solubles, a butyl fermentation residue and synthetic riboflavin concentrates were found to be satisfactory sources of riboflavin. Experiments on the breeding of chicks resistant to PULLORUM DISEASE were continued. Gas fumigation was found to be satisfactory for rendering used chick boxes safe for re-use from the standpoint of *Salmonella pullorum* contamination. Wire 0·098 in. in diameter, spaced ½ × 2 in. reduces breast blister to 6·9% in battery-brooded chicks.

MASSACHUSETTS, 1943–44.—Pasteurization has no effect on the riboflavin content of milk. When cows are changed from winter ration to early pasture there is an increase in the volume of milk but the ascorbic acid and riboflavin content is decreased; the thiamine content is unchanged. High temperature, short time pasteurization has no effect on the ascorbic acid, riboflavin and thiamine content of milk. Phosphatase plays no part in the deposition of calcium carbonate in the egg shell, the enzyme involved being carbonic anhydrase. The diseases most frequently encountered in the poultry diagnostic service were, in order, COCCIDIOSIS, INFECTIOUS BRONCHITIS, TUMOURS, PULLORUM DISEASE and a so-called "unknown disease". An outbreak of FOWL CHOLERA in chicks is described. A programme of INFECTIOUS BRONCHITIS control in poultry by inoculation of virus is being carried out.

MISSISSIPPI, 1942–43.—Investigations showed the importance of diet for the proper development of young bulls. Mineral supplements were worked out for dairy cattle in different parts of the State according to the mineral content of the soil.

MISSOURI, 1940–41.—The vitamin requirements of poultry, rats, g. pigs, rabbits and pigeons were studied. A disease resembling human HAEMOPHILIA has been diagnosed in Poland-China pigs. Temperature and pH were both found to affect the mobility of ram spermatozoa. It appears that temperature affects the rate of acid production and thus the mobility. A staining method has been developed for determining the relative numbers of live and dead sperms in semen samples. A study has been made of the follicular fluid at various stages of the oestrous cycle in the mare. The total amount of oestrogen present was one-third as great in the anoestrous phase as in the oestrous phase, but the oestrogen content per unit volume was unchanged in all phases. When rabbits were fed on hay grown on soil treated with lime or lime and superphosphate they produced more spermatozoa than those fed on hay from untreated land or land treated with superphosphate only. White Leghorn and New Hampshire cockerels showed the most rapid testicular growth from the 8th–12th week of age and sperms were first observed in testicular tissue at 12 weeks of age. A study has been made of a number of mammogenic hormones and lactogenic hormones and of the effect of artificial thyroprotein in increasing growth and lactation. Studies on the storage and dilution of bull sperm have shown that semen keeps better when undiluted and can be kept at 40°F. for 2–3 days and still remain fertile. Inconclusive transmission tests with FOWL PARALYSIS were carried out. Abligation of the caeca is recommended for control of BLACKHEAD in turkeys. Injections of 4% formalin solutions into the abligated caeca are said to prevent enlargement. It seems that *Brucella suis* cannot be transmitted from swine to cattle. Large numbers of agglutination tests in cattle for BRUCELLOSIS and in fowls for PULLORUM DISEASE were performed for farmers.

NEVADA, 1941–42.—The research projects of interest to the veterinarian are noted by title only.

NEVADA, 1942–43.—*Clostridium haemolyticum* antiserum was found effective as a therapeutic agent and aluminium hydroxide adsorbed bacterin as a prophylactic for the protection of cattle against BACILLARY HAEMOGLOBINURIA. Studies were made on PREGNANCY DISEASE of ewes, WHITE MUSCLE in Hereford calves and the MILK FEVER complex in cows and recommendations are made for their control. Two human cases of apparent EQUINE ENCEPHALITIS are reported. EQUINE INFLUENZA was not present in Nevada during the year.

NEW HAMPSHIRE, 1942–43.—MASTITIS could not be eliminated from infected cattle herds by segregation methods unless disposal or treatment of affected cattle was carried out. Studies on GIZZARD EROSION in chickens indicated that cod liver oil increases the occurrence of the condition and that cholic acid acts as a preventive. A vaccine made with "blue comb virus" proved effective in preventing the condition in a group of 45 experimental chicks and a large trial on 300 birds was being organized. Statistics are given of examinations made for the diagnosis of MASTITIS and PULLORUM DISEASE, routine poultry autopsies and the production of vaccine for "BLUE COMB" DISEASE, INFECTIOUS BRONCHITIS of chicks, LARYNGOTRACHEITIS and FOWL POX.

NEW JERSEY, 1943–44.—Observations on two cow families suggested that resistance to MASTITIS can be inherited. Experiments are being conducted on the intradermal injection of strain 19 in calves for BRUCELLOSIS control. An attempt is being made to produce a LARYNGOTRACHEITIS vaccine by propagating the virus in embryonated eggs. The use of "gonadin" to stimulate oestrus enabled three crops of lambs to be obtained in two years.

NEW YORK STATE, CORNELL UNIVERSITY, 1942–43.—Experiments have shown that defluorinated rock phosphate has a low availability for bone formation and this is suggested to be due to the presence of relatively large amounts of the poorly utilized calcium metaphosphate. Nitrogen balance experiments indicate that there is a decided difference in urea utilization by various classes of ruminants, and before urea is used to replace protein supplements, extensive feeding experiments must be carried out on the classes of ruminants concerned. The thiamine, riboflavin, pantothenic acid and niacin contents of semen were correlated with the sperm count and mobility but the addition of these vitamins to other semen samples did not improve their quality. It has been found possible to dilute semen 1 : 16 with yolk citrate diluent without decreasing its fertility.

Phenothiazine and copper sulphate + nicotine sulphate mixture were found to be equally effective against *Haemonchus contortus* in lambs but phenothiazine was better against *Ostertagia* spp. Phenothiazine was also very effective against *Nematodirus spathiger*. Studies are being made on the nutrition and metabolism of lactic acid bacteria. Deficiency of pantothenic acid over a long period has a detrimental effect on the reproduction of hens. An organic factor in addition to choline and biotin was shown to be concerned in the prevention of PEROSIS. A study of the effect of duration of daily illumination on semen production in White Leghorn males showed the threshold for maximum yields of semen to be 9–12 hours; maximum response was attained in one month. The duration of response varied from less than 4 months to more than 9 months.

OKLAHOMA, 1942–44.—Chicks fed on 85% maize produced poor feathers which improved when maize was replaced by oats or when meat products were added to the ration.

RHODE ISLAND, 1942.—A chronic respiratory disease of chicks clinically indistinguishable from INFECTIOUS BRONCHITIS was studied. The disease did not appear to cause severe losses.

RHODE ISLAND, 1943.—*Haemophilus gallinarum* was successfully grown on egg-yolk medium. When incubated for 48 hours and continuously thereafter the organisms could be recovered seven days after the preliminary incubation period, and if refrigeration after preliminary incubation was carried out the organisms could be recovered up to the 21st day. Details are given of the numbers of animals received in the routine diagnosis section and of the diseases diagnosed.

RHODE ISLAND, 1944.—Experiments carried out to determine the stability of INFECTIOUS BRONCHITIS virus over a pH range from 2·7 to 10·5 showed that the virus is less stable in alkaline than in extreme acid conditions. *Haemophilus gallinarum*, the cause of INFECTIOUS CORYZA, has been successfully cultivated on chick embryo. The causal agent of a respiratory disease of pigeons has been isolated but not identified. An account is given of the diseases diagnosed in the routine diagnosis section; in poultry there was an increase in both nutritional deficiencies and respiratory diseases.

SOUTH DAKOTA, 1942–43.—The amount of hydrogen sulphide produced when legumes were fermented in water was greater than that produced when non-legumes were fermented. It was also found that the amounts of hydrogen sulphide in the rumen increased when freshly cut alfalfa was fed. It was considered, therefore, that there was some connexion between hydrogen sulphide and "BLOAT" Although the bacteri cidal action of sulphanilamide is increased by combining it with azochloramid, the combination of the two agents causes severe tissue inflammation in the udder when used in the treatment of MASTITIS. Sulphanilamide in mineral oil has proved satisfactory and the use of a water suspension of sulphanilamide is being investigated at present. An experiment is being carried out to determine the vitamin D level in blood plasma at which deficiency symptoms develop and the intake required to keep the concentration of vitamin D in the blood plasma above this level. Linseed meal did not reduce the severity or incidence of the symptoms of SELENIUM POISONING in range cattle when fed at a rate of 1 lb. per head per day. Free access to salt containing 25 p.p.m. of arsenic did, however, protect them against selenium poisoning. Arsenic in the drinking water of chickens decreased the harmful effect of selenium on the hatchability of the eggs but did not reduce the selenium content of the eggs. An investigation into the cause of CORN STALK DISEASE gave negative results.

TEXAS, 1942–43.—Some progress has been made in the breeding of sheep and goats resistant to stomach worm (*Haemonchus contortus*). Cytological studies have shown that the chromosome complex of Rambouillet sheep is the same as that of the Merino. Feeding a high level of calcium as pulverized oyster shell or limestone to steers decreased the quantity of URINARY CALCULI, but also decreased the weight gain. Bone meal fed in high quantity decreased the urinary calculi but increased the weight gains. Feeding a high level of magnesium increased urinary calculi. One drop of nicotine sulphate applied to the skin behind the sternum of a turkey effectively kills all lice present on the bird. A method has been devised for the accurate determination of free gossypol in cottonseed meal.

VERMONT, 1943–44.—Calves fed colostrum until they were 63 days old made satisfactory weight gains. Milk may therefore be saved by the refrigeration of colostrum and its use instead of marketable milk for calf feeding. About 1% of positive cases of MASTITIS are missed when pooled milk samples instead of separate quarter samples are examined microscopically or by the Hotis test.—T. E. GIBSON.

U.S.A. NEVADA. (1944.) **[Report of the] Division of Animal Industry [1942-44].** [EARL, W. B.]—*Rep. Nev. Dep. Agric. 1942–44.* pp. 7–21. **1925**

An ANTHRAX outbreak, which occurred in an area free from the disease for several years, was controlled by vaccination of exposed animals and the application of veterinary police measures. The Accredited Herd regulations for BRUCELLOSIS are printed in full. There were small losses from SWINE FEVER, and SWINE ERYSIPELAS was diagnosed during the period covered by the report. The State is free from RABIES, CATTLE MANGE and DOURINE. The control of BLACKLEG, BACILLARY HAEMOGLOBINURIA (REDWATER) of cattle and EQUINE ENCEPHALOMYELITIS has assumed a routine status and is carried out by systematic vaccination. ANAPLASMOSIS has increased in prevalence and is now widespread. Statistics are given of the tuberculin tests carried out during the year and of Accredited Areas, the field investigations carried out during the year, the number of animals immunized by the various biological products, the number of blood tests performed for BRUCELLOSIS, and the interstate movement of livestock. The new State quarantine regulations are printed in full.—T. E. G.

PANAMA CANAL ZONE (1945.) **Annual report of the Gorgas Memorial Laboratory, 1944.** pp. 32. Washington, D.C.: U.S. Govt. Printing Office. Items of veterinary interest pp. 12, 26 & 27–28. **1926**

The greater part of this report deals with matter which is not of direct interest to the veterinarian. *Toxoplasma* sp. was the cause of an epidemic disease of carrier pigeons in Panama and 25 species of wild birds and mammals have been examined for this parasite with negative results. PULMONARY FILARIASIS caused death of monkeys at the laboratory. At the Corozal Veterinary Station the chronicity of *Trypanosoma vivax* infection in well fed sheltered cattle was studied. Special surveys of certain parasitic diseases of the blood of horses, mules and cattle have been made and the numbers of animals found positive for TRYPANOSOMIASIS, PIROPLASMOSIS, and FILARIASIS for various areas are given in tabular form.—T. E. GIBSON.

See also absts. **1708** (pullorum disease eradication in Massachusetts), **1774** (U.S. Bureau of Entomology), **1780. 1781** (Tanganyika Tsetse Research Department).

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